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1878, by Lieut.-Col. T. BLAND STRANGE, R. A., in the office of the
Minister of Agriculture.

ARTILLERY RETROSPECT
OF
THE LAST GREAT WAR,
1870;
WITH ITS LESSONS FOR CANADIANS.

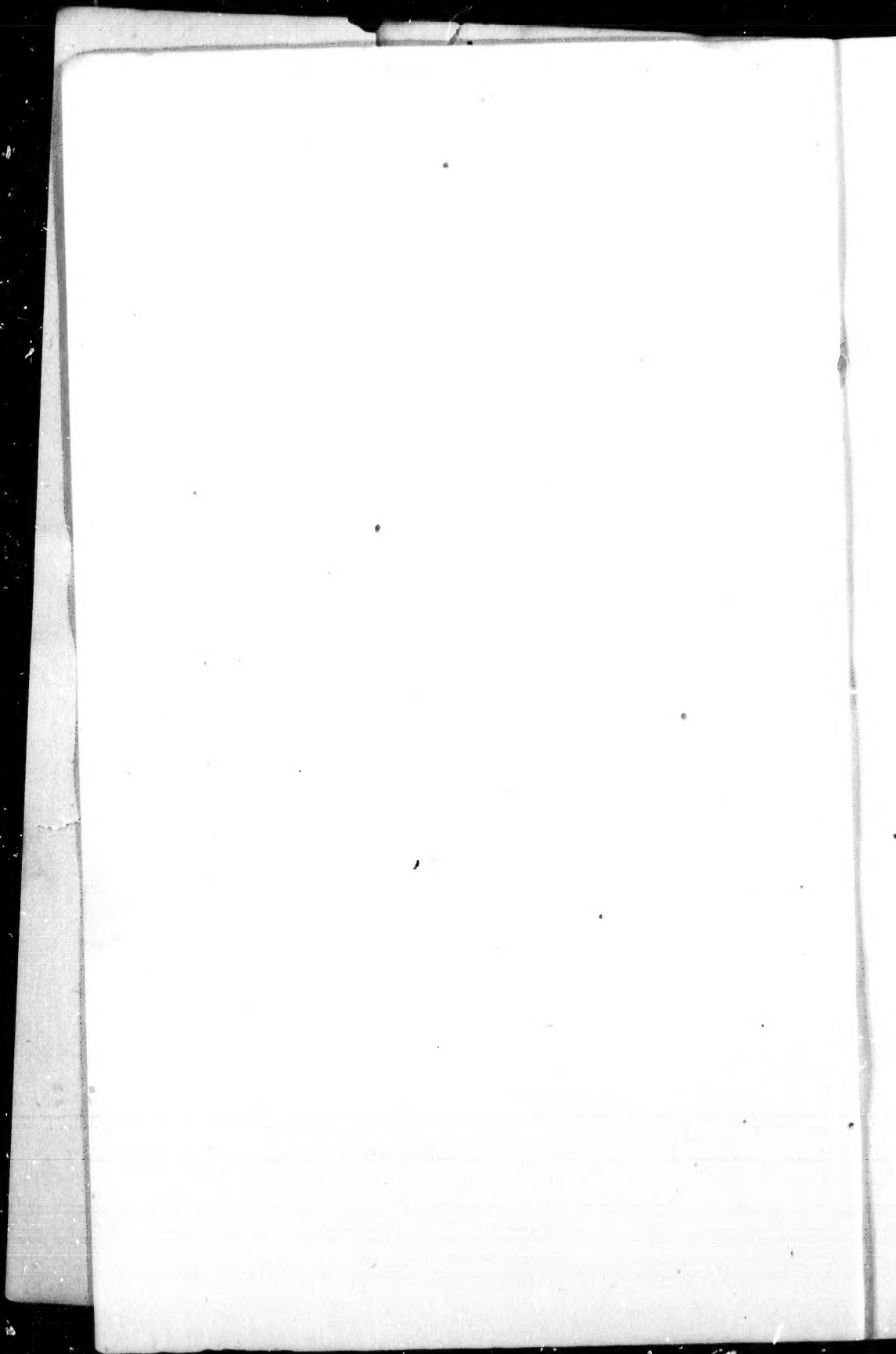
BY LIEUT.-COLONEL T. BLAND STRANGE,

Dominion Inspector of Artillery.

Quebec:

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1874.



PREFACE.

WITH the average public, the graphic articles of the press and its pictorial illustrations of *the last little war* eclipse in vivid though short-lived interest the lessons to be learnt by *the last great war*. The soldier-student, however, ponders over the latter long after the flood of special correspondence has subsided, and the mountain-peaks of the salient features appear distinctly. I cannot hope, however, that the vision of the prophet, for whom the dry bones of a great battle were shaken together, will be conjured up by the unpractised pen of a mere soldier. I attempt no such task; and, in selecting the title of "*AN ARTILLERY RETROSPECT OF THE LAST GREAT WAR*," make no pretension to the brilliant originality which was so marked a feature of the "*Retrospect of the War of 1866*," by the late lamented Captain May, who, in 1870, was killed in the ranks of that grand Prussian Army he had so faithfully served with sword and pen. His pamphlet startled the military mind of Europe. My aim is a very humble one. If to others I seem "to magnify mine office," pardon must be granted for sincerity in the, perhaps, imaginary importance of the duties assigned to me: the objects at stake assuming undue proportions to the mind of the last solitary British legionary left on the rock-crowning Citadel, with little but its glorious memories, obsolete war-material, and young soldiers around him; in the old town below, a city Corporation anxious to obtain ordnance property, and a population mainly devoted to square-timber during a short summer, and a sleep that resembles death during a long Arctic winter, in which these two evening-lectures on the last great war were given, at the request of the Literary and Historical Society of Quebec, who did me the honor of electing me a vice-President. Though well aware that artillery is not the principal arm, I limited my remarks to that branch which could, perhaps, be made more interesting to the members of the Society, and incite to professional study that

portion of my hearers and possible readers who are under my instruction and supervision as Dominion Inspector of Artillery. Lest I should be thought to imply a want of interest on the part of the officers under my immediate command, I am bound to say that the progress due to the zeal, ability, and natural soldierly qualities of these gentlemen has far surpassed my highest expectations, and rendered pleasant a task at times depressing, from want of encouragement in quarters where I have, perhaps, unreasonably expected it. I have no doubt that Lieut.-Colonel French, my late colleague, would endorse these remarks as far as concerns the Artillery Officers of the sister-province of Ontario. The present Gunnery School system was initiated under his supervision, as Dominion Inspector of Artillery, Colonel Robertson-Ross being Adjutant-General of Militia.

The Canadian Militia owe more to Colonel French than they are apparently aware of; and the great North-West will owe him still more when, as Commissioner of Police, he has shewn the world that neither white, red, nor half-breed ruffianism need be tolerated as a necessary accompaniment of the march of civilization on Canadian soil, as it has been elsewhere. For the fulfilment of this, apparently the noblest task that can fall to the lot of a soldier on this continent, he has many high qualities of head and heart.

It remains, however, to be seen whether the fact of the only apparent field for fighting having been handed over to a body of civilians, will not destroy the *esprit* of those small, but, I believe, efficient, corps of Canadian soldiers, already three years under military training, to whom the performance of police-duties in towns is delegated; while to the more fortunate civilian has fallen the post of honor, of danger, and of ultimate profit.

The disappointed ones will best shew their discipline by a hopeful attention to duty, in the expectation that their turn may yet come. Unfortunately, while the door of active service is closed on one hand, on the other the opportunities of higher military study are likely also to disappear, as far as the Quebec School of Gunnery is concerned; for it is not to be supposed that the annexed *curriculum* of study, carried out by

a single officer, without professional assistance, for three years, can still be continued if a Military College, with a sufficient staff of instructors, is established elsewhere.

*" Sic vos non vobis nidificatis, aves ;
Sic vos non vobis vellera-fertis, oves ;
Sic vos non vobis mellificatis, apes ;
Sic vos non vobis fertis aratra, boves."*

T. BLAND STRANGE.

CITADEL, QUEBEC, July, 1874.

SYLLABUS OF OFFICERS' LONG COURSE, GUNNERY SCHOOL,
QUEBEC.

TO BE ABLE TO INSTRUCT IN

Gun Drills, }
Mortar Drill, } and Practice with Projectiles.
Gyn Drill.
Shifting Ordnance.

TO HAVE A GOOD KNOWLEDGE OF

Infantry Drill.
Riding Drill and Stable Duties.
Field-Artillery Movements and Positions.
Artillery Material and Stores.
Examination and Sighting Ordnance.
Laboratory Operations.
Construction of Siege Batteries, Rafts, and Bridges.
Gunnery and applied Mathematics.
Fortification and Sieges.
Military Surveying and Reconnaissance.
Tactics of all Arms, Strategy, and Military History of one Campaign.
Interior Economy, Regimental Duty, and charge of Armament of the Fortress.
Queen's and Militia Regulations, and Articles of War as applied to Canadian Militia.

T. B. STRANGE, LIEUT.-COL.,
Commandant S. G. and I. of A.

SYNOPSIS OF OFFICERS' SHORT COURSE, GUNNERY SCHOOL, QUEBEC.

PRACTICAL EXERCISES AND DUTIES.

Garrison Artillery.

Arm Drill.
Company Drill.
Heavy Gun Drill, S. B.
Do., Rifled.
Mortar Drill.
Do., (removal on Trench carts.)
Gyn Drill.
Shifting Ordnance.
Sling Waggon.
Knotting and Lashing.
Gun Practice.
Making up Ammunition.
Examination and sighting of Ordnance.
Taking Angles with Sextant for
Range-finding.
Visiting (weekly) Artillery Stores and
District.
Interior Economy and Regimental
Duty.
Attending Courts-martial.

Field Artillery.

Field Gun Drill.
Riding and Driving Drill, Wheel-
Carriages, or Sleighs.
Field Battery Movements.
Disabled Field Ordnance, removal of.
Knotting and Lashing.
Mounted Sword Exercise.
Gun Practice.
Making up Ammunition.
Examination and sighting of Ordnance.
Taking Angles with Sextant for
Range-finding.
Interior Economy.
Stable and Regimental Duties.
Attending Courts-martial.

Officers will give their special attention to those subjects which belong to their own branch of Artillery service, but will be expected to have a general idea of the whole.

T. B. STRANGE, LIEUT.-COL.,
Commandant S. G. and I. of A.

SYNOPSIS OF SHORT COURSE, GUNNERY SCHOOL, QUEBEC.

THEORY.

Gunnery, exclusive of applied Mathematics.
Knowledge of Artillery Material, such as exists in Citadel, Quebec.
Laboratory Operations as performed at Quebec.
Examination and Sighting Ordnance.
Elementary Fortification.
Minor Tactics of Artillery, in connection with the other Arms.
Range-finding, use of Sextant and Prismatic Compass.
General knowledge of Militia Regulations, Queen's Regulations and Articles
of War, as applicable to Militia.

T. B. STRANGE, LIEUT.-COL.,
Commandant S. G. and I. of A.

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The death of a lamented partner of the publishing firm, as well as the severe illness of the foreman, has delayed the issue of this little work, which being intended originally for private circulation a few copies only were printed until a request for more caused a reprint, together with an appendix to the 1st part.

ERRATA.

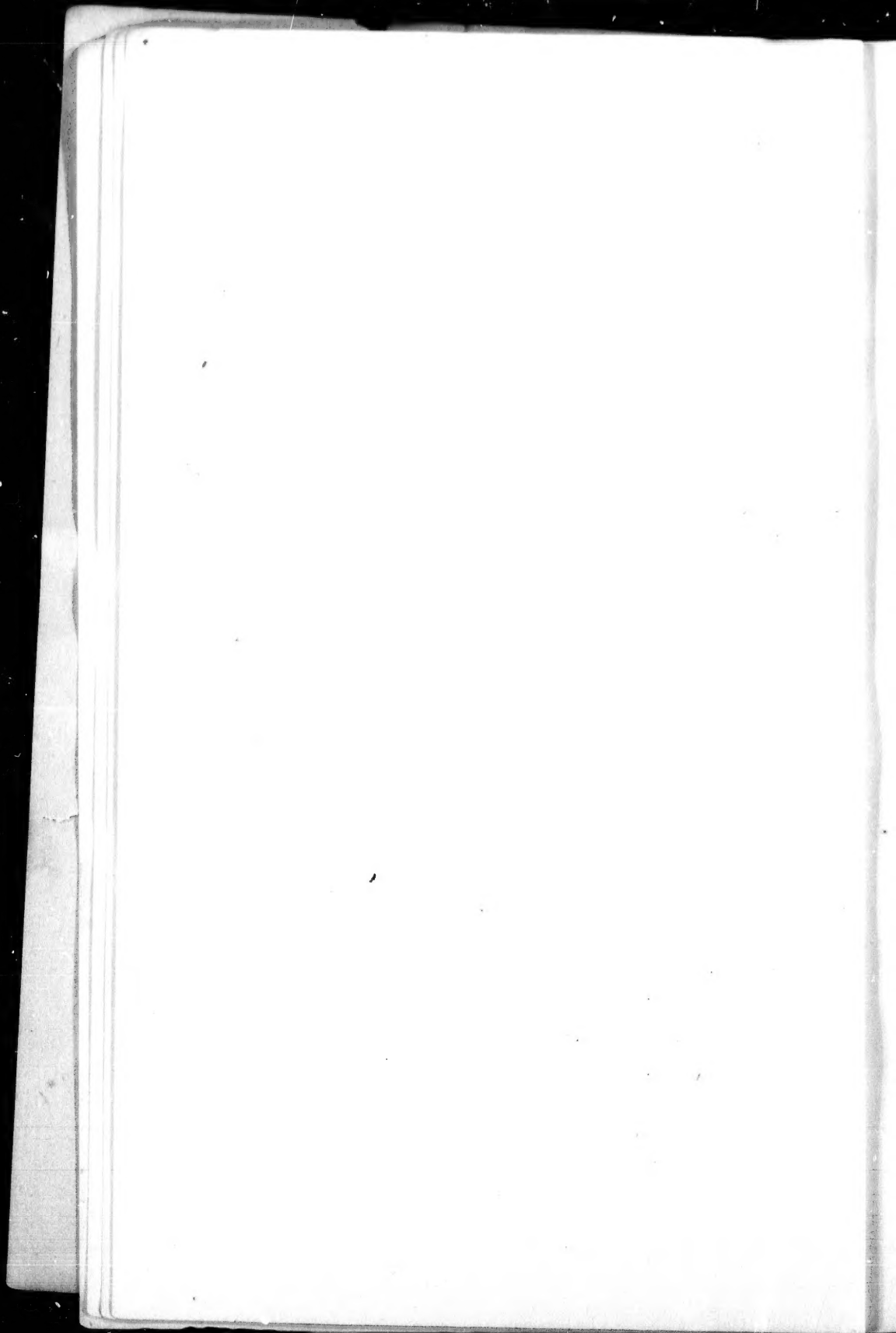
(1.) The Plates have been ably rendered by Messrs. Desbarats & Co., Montreal, by the Photo-lithographic process. Plates D. E. F. were reduced from some of those in the valuable work entitled, "La Marine au Siege de Paris." par le Vice-Admiral B de la Roncière le Noury.

(2.) Preface 16th line, after "sincerity" read "of belief."

(3.) Page 16, 8th line 2nd paragraph, for "them" read "those" also, the 9th line of the same paragraph.

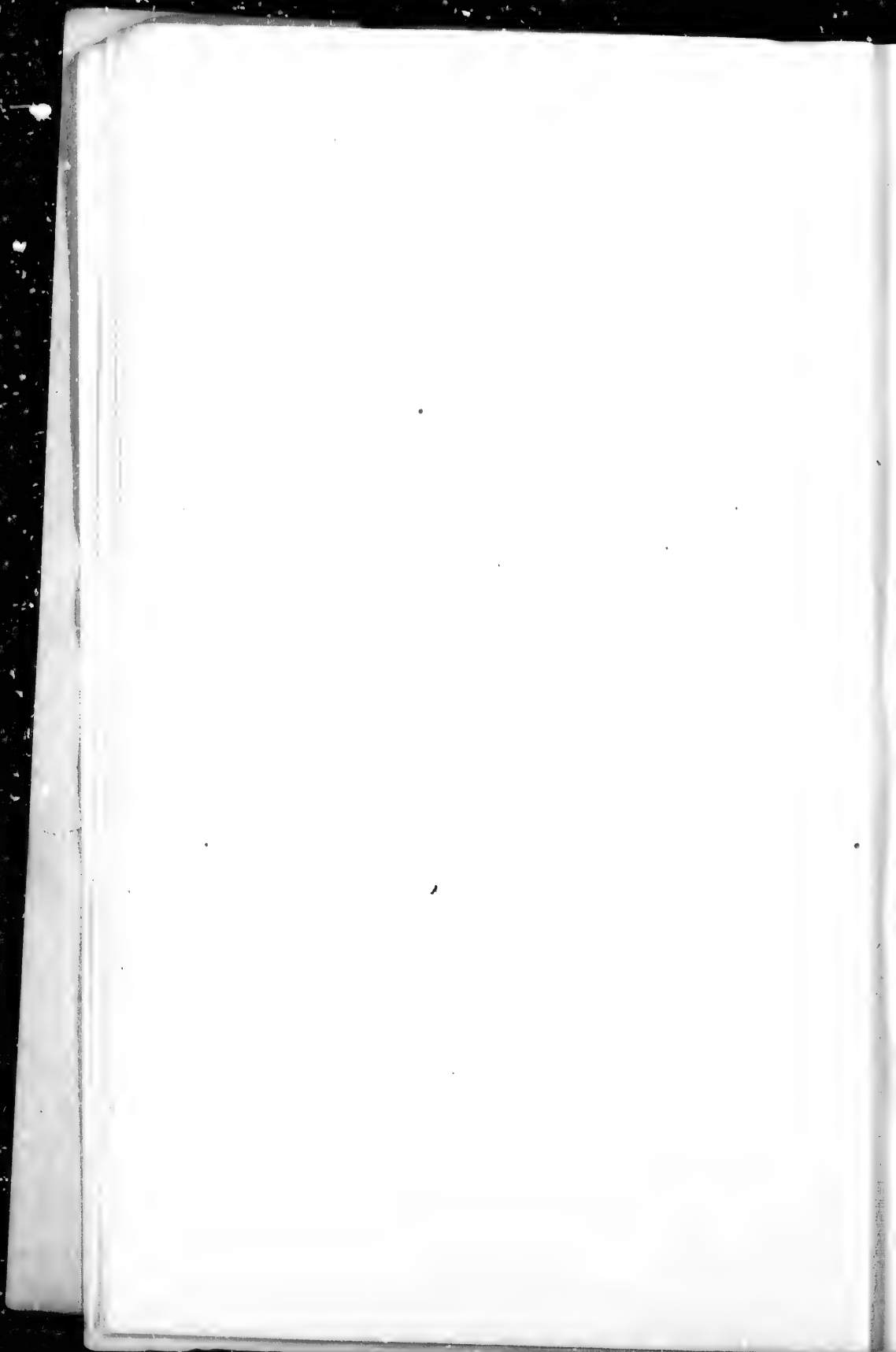
(4.) Page 23, 2nd paragraph after Schelestait read Phalsburg.

(5.) Page 43, Note, for "the coming winter" read "December 1875"
2nd line for "the former" read "they,"
4th line after "but" read "the former."



PART I.--FIELD ARTILLERY.

2ND. EDITION.



ARTILLERY RETROSPECT

OF

THE LAST GREAT WAR, 1870.

BY LT.-COL. T. B. STRANGE, DOMINION INSPECTOR OF ARTILLERY.

(A Paper read before the Lit. and His. Society of Quebec, April 3rd, 1872.)

"*Pends-toi, Crillion ; nous nous sommes battus et tu n'y étais pas,*" was the laconic letter of the royal soldier *Henri Quatre* to his comrade,—the same soldier-king who gave the right royal response, when asked for a standard :

"Where'er ye see my white plume shine,

"Amid the ranks of war,

"Then be your oriflamme to-day

"The helmet of Navarre."

A great war—alas ! I fear, by no means the last great war—has passed into history ; and as I was not there to see, how can I venture on a retrospect without craving your indulgence?—which you may be more likely to give when I tell you that, to gratify no idle curiosity, but simply as a soldier to learn, I asked and obtained the sanction of H.R.H. the Duke of Cambridge to join either of the contending armies, but was given to understand that political reasons forbade me or any of my brother-officers availing ourselves of the permission, even at our own risk and cost.

Permission was subsequently granted to a few as newspaper correspondents ; but no English artillery officer was present at the great drama of the Prussian siege of Paris. We were disappointed, but not inclined to follow the advice of *Henri* to his friend. At the conclusion of peace I visited the remains of both armies and many of their battle-fields. I had some friends among the officers of the French artillery, acquaintances made in happier days at Châlons. I never saw them again ; and in spite of the contempt heaped upon the unsuccessful by the unthinking, I cannot but feel, from what I saw and heard from their enemies, that they did their duty.

Without further apology I will aim at my object, and try, like a good gunner, to hit it. My subject divides itself into:

1st—Salient artillery operations in the field, and the lessons we may draw from them;

2nd—The artillery *personnel* and *matériel* of the contending armies;

3rd—The sieges and their lessons;

4th—The general deductions we may draw.

SALIENT ARTILLERY OPERATIONS IN THE FIELD.

It is commonly supposed that the superiority of the Prussian artillery was the principal cause of the German success, and, indeed, the emperor Napoleon himself attributed his final disaster at Sedan to the preponderating influence of the German field-artillery; but it was not altogether so: the artillery was but the keystone of that arch of triumph under which the German Emperor marched to victory.

It is easier to blame the grooves of a gun than the heart of a great nation. The French people (for I hold people responsible for their government) preferred a standing army and a system of substitutes to a national force and universal service; therefore, they were utterly outnumbered; and their centralized system of dealing with war material, of which the English control is a bad copy,* rendered it impossible for them to equip and mobilize their armies as quickly as the Germans, who habitually decentralize and delegate the responsibility of equipment to the commanders of their local *corps d'armée*; and lastly, they were out-generalled, because their *état major* and system of military instruction were inferior to the Prussian. Notwithstanding the war-cry, "*à Berlin*," they found themselves on the defensive, extended over a long arc from Thionville and Metz to Strasbourg; while the Germans operated on the shorter cord of that arc by the valley of the Saar and Wissenburg. The French advanced posts, too far from their supports, hugging the frontier, yet not feeling beyond it, knew not of the vast

* Sir William Mansfield calls "the control a system for uneducating Generals," and I would add Artillery officers, who are scientifically and practically instructed in the manufacture, repair, and care of war material; and yet, you take from them the most important part of their duties, to be handed over to civilians.

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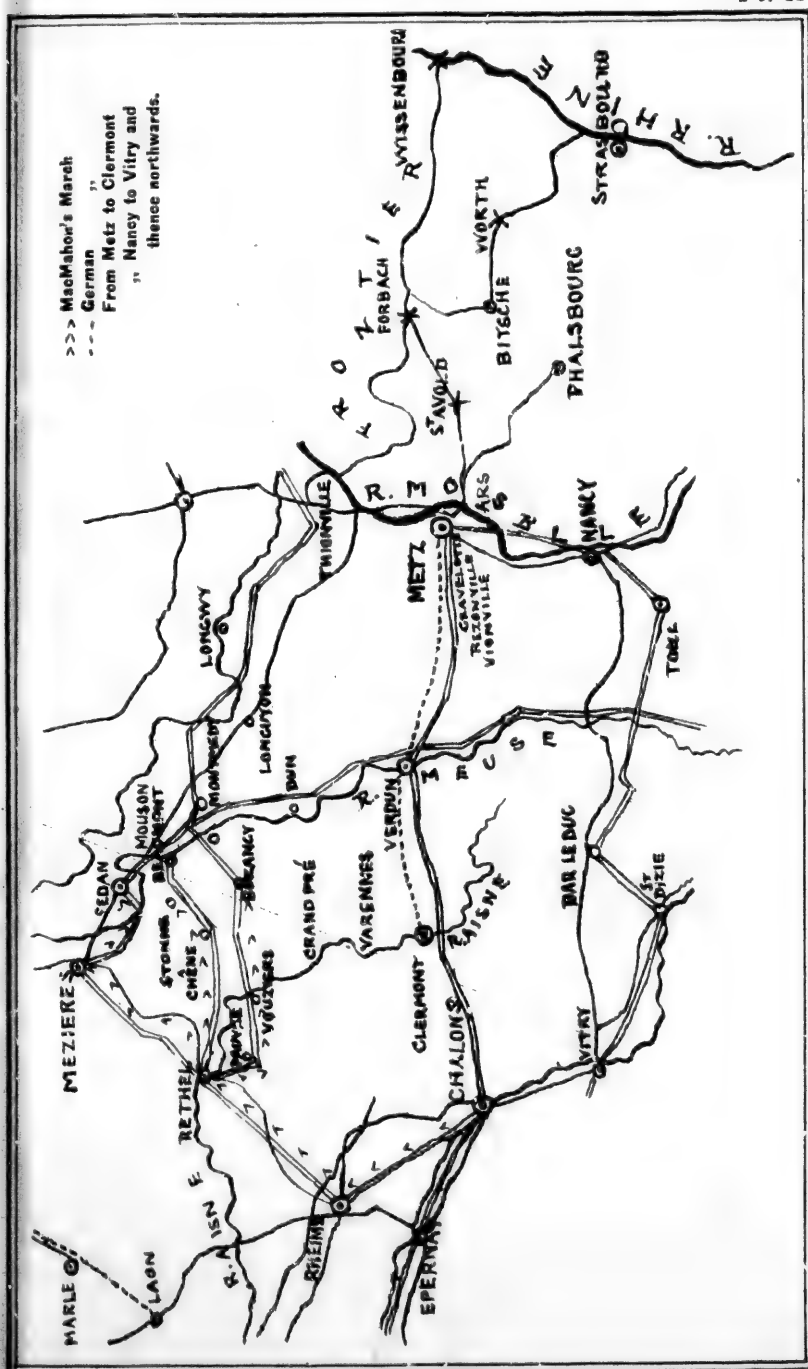
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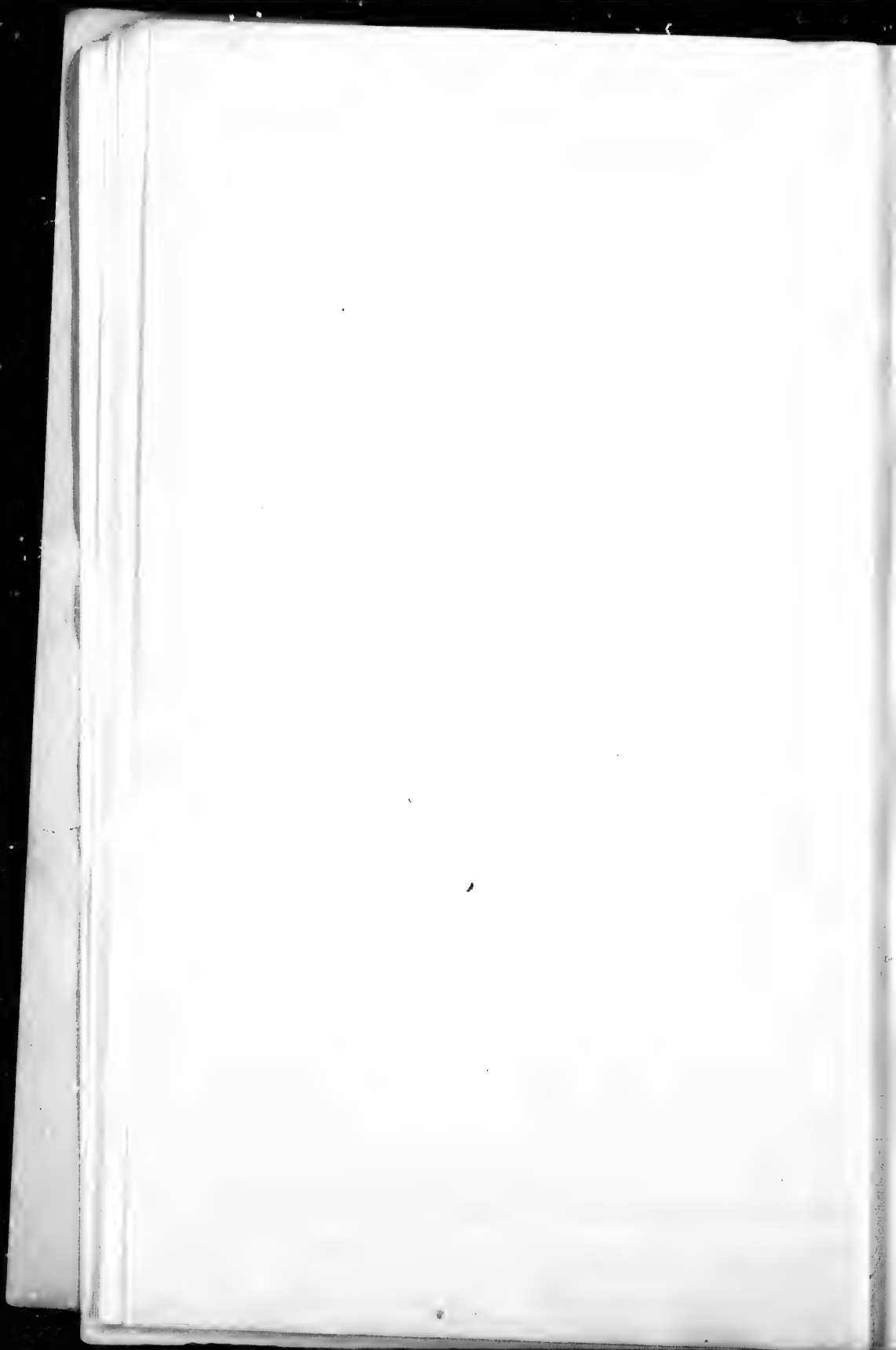
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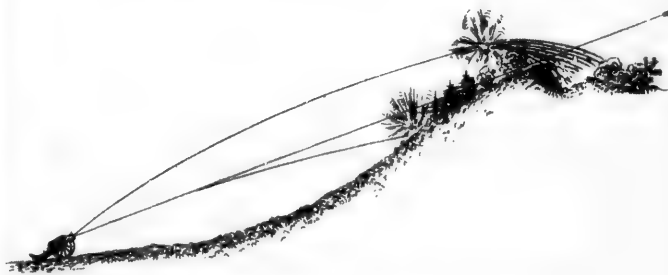
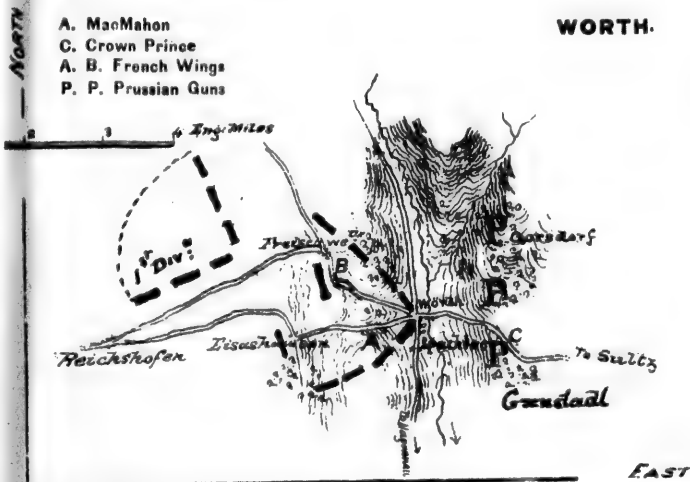
German concentration in the wooded country close to their front. It is very difficult to unravel the thread of artillery action from the tangled web of battle, because artillery plays a double part in the great game—1st, divisional, or merely supporting and acting with the other arms; 2nd, concentrating and striking terrible and decisive blows as a separate arm. Moreover, the first accounts of battles reach us from the pens of journalists, generally men of great energy and ability; but tall talk is their *metier*, and they are obliged to supply public demand for blood-and-thunder at so much a line. Even soldiers, themselves engaged, are the poorest narrators of the outline of an action, being so entirely engrossed with what passes in their immediate front. Waterloo veterans still wrangle as to whether the final repulse of the last French column was due to the advance of the 52nd or the Guards. Comparing small things with great, I have been unable to recognize the official accounts of actions in which I had the honor to be engaged.

The first great battle of the last great war was at Wissenburg. We cannot linger over the historic reminiscences of the old fortress that once rolled back the tide of war under Marlborough.

In the same locality the Crown Prince of Prussia, with more than forty thousand men, surprised and destroyed the corps of General Douay, only 8,000 strong. While the French were cooking their morning soup, the mass of Prussian guns, having gained the heights of Schweigen, suddenly opened a heavy fire on the enemy's camp and the village of Wissenburg. With the old impetuosity of their race, the French sprang to arms, but were ordered by General Douay to remain as much as possible behind Wissenburg. The precaution was useless: the Prussian guns, from their commanding position, rained death upon them, whether they advanced or sought shelter. The French artillery, consisting only of three light field-batteries and one of mitrailleurs, was soon overwhelmed; and, according to the German official account, "the mitrailleurs fired only a few rounds, and were easily silenced by the Prussian guns." The overwhelming numbers of the Crown Prince outflanked and took the hill of Geisburg; the outnumbered French, still pursued by the deadly Prussian shells, and harassed by the cavalry, turned retreat to rout. Wissenburg was quickly followed by Wœrth. The French position was salient, almost semicircular; thus offering to the Prussians the opportunity ever coveted by artillerists,

viz., the chance of enfilading both wings from a point nearly opposite the centre. The Prussian guns were thus massed on the heights south of Gorsdorf and north-west of Gunstadt, and, as usual, they were felt before they were seen. Those on the Gorsdorf heights commenced the action by enfilading the whole French left, and compelling Marshal MacMahon to change the front of the first division: the manœuvre was brilliantly executed by the French. Later in the day, fourteen German batteries (84 guns), near Gunstadt, were launched upon the French right wing, enfilading it in the line of its greatest depth; and not only the fourth division, but also the unfortunate second, which stood behind them, and had already borne the brunt of battle at Wissenburg. A battery of the 5th corps, north of Spacbach, occupied the French guns; these latter are said to have been well served but poorly handled, for the gallant French artillery seem to have forgotten the tactical lessons of their great artillery chief, Napoleon I. They, however, nobly sacrificed themselves at the close of the action in endeavoring to save their broken infantry. At this battle, also, the French were greatly outnumbered, and failed to receive assistance from De Failly's corps. MacMahon's position was strategically good, as fairly covering the two important railway communications with Strasbourg through Hagenau, and with Metz *via* Bitsche. On the same day that the Crown Prince thus severed the French army and cut off its right wing, some forty miles distant, in a north-westerly direction from the field of Wœrth, the first Prussian army, under Steinmetz, assisted by part of the second, also cut the French line at Spichern, thus hopelessly dividing MacMahon and Bazaine. The ridge of Spichern overlooks the village of Sääbruck, the scene of the *baptême de feu* of the Prince Imperial. As usual, the French were surprised by the opening of the Prussian artillery, six batteries, from a hill overlooking the valley from which a part of Frossard's force had not been withdrawn. The leading artillery features of the battle are the rapid bringing-up and concentration of guns, in some instances galloping along the roads to the front, while the infantry of their divisions were partially sent on by rail. This mobility of field-artillery is possible only to the Prussians—not to the French, from a defective system on which I shall touch. It is said that the Prussian guns, after advancing over the plain, produced little impression, firing up-hill on the French infantry extended on the ridge, from the fact that shells fired

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The French guns massed on the left to oppose the flanking movement on Stiring, dislodged the mass of Prussian cavalry who were sent under cover to the other flank. This should have been a great gain, because the road to Forbach was the strategic line of French retreat and support. But the crowning artillery achievement was the daring advance of two batteries of German guns up a steep mountain-track, on to the summit of a ridge on the French right, where they enfiladed the whole line. I was informed, through a Prussian general, that the French line, who had resisted so gallantly, were first shaken by this fire, which drove them from their entrenchment, and rendered possible the final advance of the German infantry, whose previous losses, while supported only by direct artillery-fire, had been terrible; also, at this critical juncture a mass of German guns advanced, and, firing across the road and rail, enfiladed the French left, and threatened to cut off the line of retreat. In the earlier part of this battle the French had the superiority in numbers and position; but they were left by their generals with a most inadequate supply of artillery—one of those unaccountable mistakes which marked French generalship. While Frossard's force fought splendidly all day, seven divisions of Bazaine's stood inactive ten miles from the valley of the Saar. The Germans, having turned the French left by Forbach, the 2nd division, sent by Bazaine, could not cover the retreat of Frossard's utterly disorganized force, which retreated to the south-west, leaving open the road to St. Avold and Metz. Then the German armies, with a cloud of cavalry in their front, gradually brought up their left flank. The small fortresses of Phalsburg and Bitsche, especially the latter, whose guns commanded the line of rail to the west, compelled them to make a considerable *détour*, and leave behind a masking force. They held out for a long time, and shew the advantage of even a small fort on a strategic line of road or rail.* The French commanders proposed to abandon the line of the Moselle, leaving a garrison in Metz with orders to defend or die,—the scattered divisions concentrating at Châlons (the only safe point for concentration),

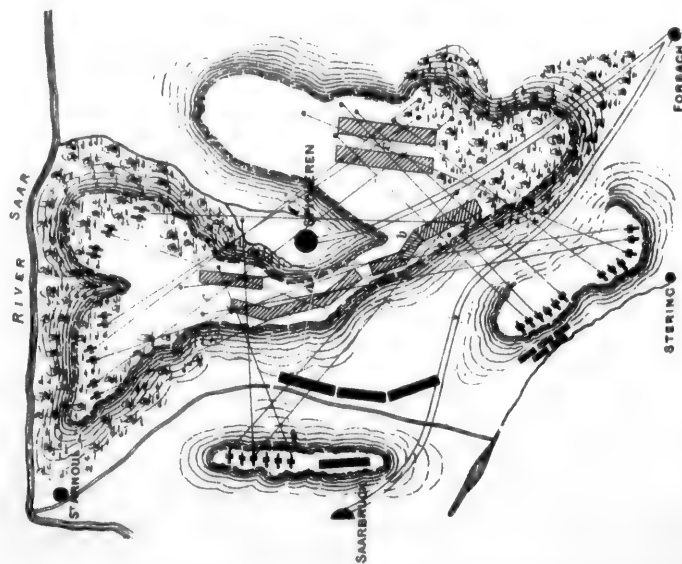
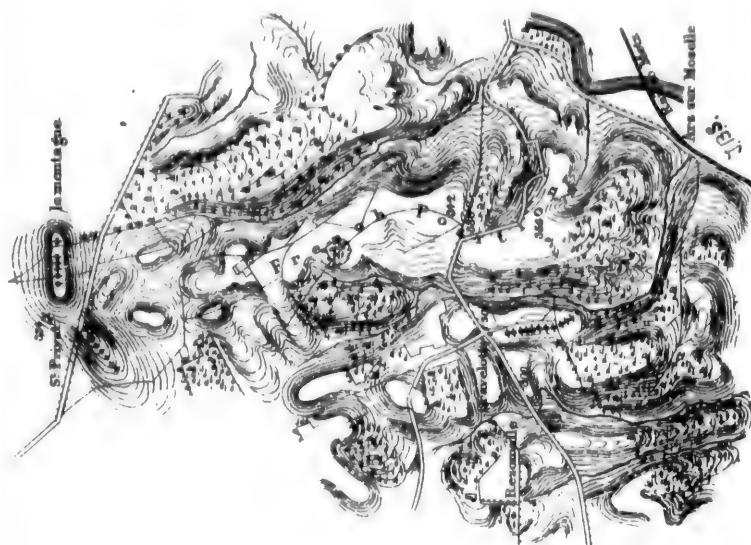
* Phalsburg, with 60 old gunners, 1500 Mobs, and a handful of Zouaves and mixed-up regulars, was bombarded, but held out six months, until want of salt, it is said, caused surrender.

there to fight on their well-known exercising ground, where, history tells us, the fate of France had before been decided in her favor. With Paris as a base and reinforcements to swell the army, the result of the war might have been different; but politicians stepped in and decreed her ruin. Bazaine, appointed to the chief command, remained at Metz (where the Emperor also lingered), hoping to fall upon the divided German armies crossing to the north and south of Metz; but their whole force passed to the south at Ars and Pont à Mousson, while Steinmetz had occupied the attention of the French by the battle of Courcelles. This was an obstinate soldiers' battle, without any particular display of tactical skill. Bazaine committed an error in fighting at all: having previously determined to retreat towards Verdun, he should have done so, and left the protection of his rear to the fortress, instead of fighting a battle with his army astride of the Moselle, and an enemy whose object it was to detain him. The French engineers had unaccountably neglected to blow up the bridges over the Moselle, to the south, though they destroyed some in their own line of retreat. Bazaine's first march was a very short one, and impeded by an enormous quantity of baggage. He gives a further reason for delay in the fact that the French intendency, or control department, had stowed away six million of cartridges without telling him where to find them, and, moreover, had themselves forgotten their whereabouts. This gave the Germans time; they pushed forward as far as Mars-le-Tour with cavalry and guns, and struck the head of the French advance, also cavalry, apparently without guns. The French prepared to charge; but the German cavalry, who masked their guns, wheeling right and left, opened out and left the guns to work their deadly destiny, and thus turn the tide of French retreat.

At Vionville and Rézonville, in a somewhat similar manner, the French columns were fiercely struck, and held by cavalry and artillery until the infantry came up. The success of the final infantry onslaught is attributed by Captain Hozier to the Prussian artillery being, as usual, massed on their enemies' flank. The extraordinary mobility of the Prussian field-artillery, principally due to their system of carrying sufficient men on limbers and gun-axle-seats, rendered possible their style of vigorous artillery action, impossible to the French with their antiquated system of carrying gunners on the wagons, or leaving them behind out of breath.

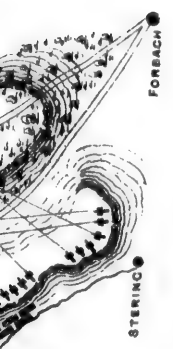
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The Prussian cavalry sacrificed themselves with the same heroic gallantry as the English at Balaclava, with the difference that their self-sacrifice had a strategic object and result, viz., holding the French for their comrades to come up. One terrible charge was made through two French batteries with bodies of infantry in their rear, to be finally met by the hostile cavalry. A little more than a fourth of the horsemen responded to the regimental call at that night's bivouac.

The French fought with the determined fury of their race, and inflicted terrible losses on their enemies, considering that they had gained a victory; but as corps after corps came into position on the left, and wheeled up, the German army, which at first looked northward, finished the fight with its front to the Rhine; while Bazaine had been compelled to fight with his face towards Châlons, and Paris his line of retreat, just a fortnight from the opening affair at Saarbrück. After these bloody struggles at Mars-la-Tours, Vionville, and Rézonville, Bazaine took up a position at Gravelotte. He had been nearly taken prisoner by the rapid German advance, whose guns had actually opened fire on the rear of the Emperor's escort as he left the army with his son. The tactical advantages of Gravelotte as a defensive position shewed skill in the selection of ground, for which Marshal Bazaine is famous. It is a long ridge, the top of which forms an open natural glacis; the crest was strongly intrenched, and his artillery there posted; the left rested on densely-wooded ravines, running down to the Moselle; and one of these, parallel to the face of the position, is difficult to cross except by the road running at right angles to the French front, which was swept with guns and the fire of a fortified farm-house. The Prussians lost terribly in repeated attempts to attack by this central road. And it was a terrible waste of life, as it was only necessary for the Prussians to hold the French in this part of the field until the strategic key of the position was turned upon them. The Verdun road, on the French right, in the direction of St. Privat, was that key, Bazaine's line of communication with France. The difficulties of assault on the left of the position (together with the fact that the reserve of the French Guards, who were posted in a valley on the left rear, supported by the forts of St. Quentin and Phlappesville, would have rendered German advance in this direction a barren and bloody honor,) made this part of the fight on the Prussian



right almost entirely an artillery action, where the corps artillery, 84 Prussian guns, were deployed by a most spirited manœuvre. With Hussar escorts they galloped up a lane through one of these ravines, which concealed them till they reached the *plateau* south of Gravelotte, sending their ammunition-wagons by another road parallel and leading to the rear of the intended position on which the 14 batteries deployed in succession. The guns were crowded, to avoid drawing fire by extending in front of the village, which was used as a field-hospital; and the loss of the Prussian artillery here is evident from the mounds of earth that mark their resting-place—"man and horse in one red burial blent." The three leading batteries were met by the fire of four *mitrailleurs*; but, concentrating their whole fire on the nearest, there remained nothing but wreck after a single round. The second and third were treated to a similar dose of concentration, and the fourth retired precipitately to avoid annihilation.

This concentration of fire, to be produced in the heat of battle, must be inculcated and practiced in peace. The whole 84, thus concentrated on the French guns, silenced them in succession. This sort of advance of the right men, at the right time, to the right place, was, in a great measure, due to the excellent maps served out to artillery-commanders by the Prussian War-office. I was favored with the loan of one of these that belonged to a Prussian captain of artillery: it was a photograph-copy of the map of the French survey. They were turned out in Prussia by thousands long before the war; and, though it folded up so as to fit the pocket, it was so clear that by its aid any average artillery-commander could act with trenchant certainty. Among the sayings of soldiers worth remembering is that of Marshal Saxe, that "the first requirements of an army were legs, the 2nd legs, and the 3rd legs." It is equivalent to that of Wellington, who reiterated "boots." With us it might possibly be "snow-shoes." Prussian officers reiterate "maps," accurate maps, distributed to staff-officers, squadron-leaders, and battery-commanders. The infantry, working in larger units, do not require so many, except on outposts. The French resisted every assault until the ammunition of Canrobert, who commanded their right, failed. They were, as usual, outflanked by the Prussians (the Guards and Saxons), whose artillery, occupying the hill of St. Privat, at right angles to the French position, enfiladed it, and rendered

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possible the steady advance of the infantry, whose previous attack in column without sufficient artillery preparation had been such a sanguinary failure. It is worthy of note also that the isolated attempts of German artillery to advance in the open to close range, 600 yards, against infantry in shelter trenches, resulted in artillery destruction. On one of these occasions, a single gun, one officer, and three gunners alone remained; and when ordered to retire, the young subaltern's reply, from the midst of his dying comrades, was: "Tell General Steinmetz that where guns have advanced, there also can infantry. Let him send supports to me; I will not retire to them; rather will I die on my gun-carriage, and rest here with my comrades." He did not retire from his position until he had expended his last shot, and brought his gun, which he had worked with the assistance of his three gunners, safely out of action, for the infantry did not come forward here until much later.

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The final catastrophe of Sedan was the greatest triumph of the German artillery. When that fatal morning dawned, the unfortunate French saw, from every gentle hill of the amphitheatre that surrounded them, the white puffs that shewed the trial-shots of German guns. Their concentrated fire was unendurable, and enfiladed each face of the old fortress situated in a basin; and thus a fortress and army fell before the field-guns of an army wielded with strategic skill. Of course, we must not forget that it was political interference that dictated a movement on a line that ended in a fight with a neutral instead of a friendly territory in the rear.

Not much artillery-incident of value is to be gained by following the struggles of the brave but ignorant and undisciplined levies, *en masse*, who, organized by eloquent *avocats*, tried in vain to oppose the national army of a people who for half a century had patiently practised the art of war in peace, and were not too effeminate to ignore the duty of personal service, without exception, for peasant, peer, or prince.

Now for the artillery lessons we have to learn. The efficiency of artillery must be considered as *Scientific*, *Technical*, and *Tactical*.

SCIENTIFIC.

Comparing the French and German artillery officers under the first head, I am inclined to think the French artillery

officer, being a competitor *élève* of the *école Polytechnique*, was more highly trained to pure mathematics than the German, to the exclusion of more practical artillery knowledge; for an instance is recorded of an artillery-officer of the French Imperial Guard expressing himself ignorant of the fact that rifling produced derivation or constant deflexion on the projectile of his piece. This neglect of practical artillery is further shewn in the fact that the French artillery drill-books contained no gunnery rules, while the Germans are carefully instructed. We may infer, therefore, that there may be high scientific training in pure mathematics without corresponding practical training; indeed, the means is often substituted for the end. Mathematics may be looked at as a species of mental gymnastics; yet some professors would lead us to suppose they are the end and aim of life, civil and military.

TECHNICAL.

From a technical artillery point of view, we must consider both the gun and the gunner.

The much-abused rifle-gun of France, it must be remembered, is the oldest in Europe. The march of the artillery of the first Napoleon was muffled from Austrian ears by hay-bands round the wheels. The astute nephew introduced rifle-guns, and, after passing them over the Alps in packing-cases, marked "glass, with care," startled Europe and shattered the Austrian reserves at Magenta and Solferino. There was some excuse for reposing on laurels thus gained; and we must not forget that the last British muzzle-loading rifle field-gun, the hardest-hitting, farthest-ranging, most accurate gun in the world, is but a modification of the French system applied to steel and wrought-iron instead of bronze. The magnitude of misfortune must not lead us to ignore the military sagacity of Napoleon III. and the French artillery in the earlier days of the empire. It only shews that laurels are not to be rested upon; and there is, alas! no truce to preparation for the great game of war.

It was principally a matter of economy that compelled the officers of the French artillery to rest content with their old guns (in very many instances smooth-bores rifled up), without ever being recast.

And when re-cast, our experience at Woolwich would tend to shew that the older bronze is better than the new. Like

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Table of Comparative Ranges of British and Foreign Field Guns.

Nation.	Nature of Gun.	Calibre.	Charge.	Nominal weight of ammunition.	Initial Velocity.	Ranges, in yards.											
						10	20	30	40	50	60	70	80	90	100	110	120
BRITISH	16-pr. M. L. of 12 cwt...	3.6	3	0	1355	725	1150	1560	1920	2245	2560	2840	3120	3400	3680	3920	4150
	12-pr. B. L. of 8 cwt...	3.0	1	8	1170	580	1000	1395	1730	2015	2245	2500	2840	3065	3280	3480	3740
	9-pr. M. L. of 8 cwt...	3.0	1	12	9	660	1125	1490	1810	2085	2350	2605	2835	3040	3215	3420	3676
PRUSSIAN	6-pr. B. L. of 8.3 cwt...	3.604	1	4.8	15	3	1087	410	779	1107	1410	1673	1935	2197	2440	2675	2896
	4-pr. B. L. of 5.5 cwt...	3.039	1	1.6	9	6	1210	492	940	1290	1634	1927	2183	2460	2666	2924	3141
	12-pr. M. L. of 12 cwt...	4.776	2	3	25	6	4	100	443	820	1115	1400	1640	1845	2047	2237	2405
FRENCH	4-pr. M. L. of 6.5 cwt...	3.408	1	3	9	0	1086	415	765	1047	1305	1531	1725	1910	2084	2240	2385
	6-pr. B. L. of 8.5 cwt...	3.622	1	5.6	15	0	—	475	875	1246	1555	1914	2216	2488	2756	2996	3215
	4-pr. B. L. of 5.7 cwt...	3.071	1	2.7	9	3	2	1240	624	1022	1381	1723	2024	2298	2570	2824	3040
AUSTRIAN	8-pr. M. L. of 9.8 cwt...	3.83	2	0.75	14	8	1105	510	830	1130	1410	1675	1910	2150	2380	2565	2750
	4-pr. M. L. of 5.2 cwt...	3.08	1	2.5	8	0	1054	535	825	1120	1365	1555	1786	1990	2180	2355	2520
	9-pr. B. L. of 12.3 cwt...	4.2	2	11	3	24	6	1050	470	835	1185	1515	1810	2095	2370	2630	2880
RUSSIAN	4-pr. B. L. of 6.3 cwt...	3.42	1	5.6	12	10	1004	410	755	1075	1370	1645	1930	2170	2410	2635	2830
	20-pr. M. L. Parrott of 15.7 cwt	3.67	2	0	19	6	—	420	840	1265	1650	2100	2550	2950	3350	3665	3750
	10-pr. M. L. Parrott of 8 cwt	2.9	1	0	10	0	—	400	800	1180	1550	2100	2270	2600	2806	3000	3200
AMERICAN	3-inch M. L. ordnance of 7.3 cwt	3.0	1	0	11	0	—	645	1010	1310	1595	1850	2100	2325	2510	2750	2910

It might have been a good investment for Canada to have bought up, at a low figure, the discarded breech-loading British field-guns and equipment, complete: they might possibly have been had for the asking, as their carcasses encumber the English arsenals, and their ghosts would scarcely cross the Atlantic to haunt their detectors at home. With axle-seats, the backs of which would form bullet-proof shields, the advantage of cover for the gun-detachment, inherent to breech-loaders, would have been developed; while the intelligence of Canadians would not, I think, have been at fault in keeping them in order.

many ancient arts, it has fallen into inefficiency from disuse. The metal was soft, and was said to wear so quickly as to produce inaccuracy. Using up some of the old guns possibly necessitated a larger calibre than the length of projectile admitted. We see from the annexed table, taking the ordinary field-gun of both countries, that the

French 4-pounder—calibre, 3.41—"gives an area of 9 square inches, nearly, resistance to air; initial velocity, 1066 feet per second.

Prussian 4-pounder—calibre, 3.089—"gives an area of 7 square inches, nearly, resistance to air; initial velocity, 1184 feet per second.

Therefore, the French shell, which offers more resistance to the air, starts with less velocity than the Prussian, and a higher trajectory, which means less accuracy or margin of error, less range, less striking power.

It must be borne in mind, in considering the annexed table, that the nomenclature of rifled field-guns in England differs from that of other countries. We speak of the gun by the actual weight of the elongated projectile it throws, while foreign artillerists designate the rifled piece by the weight of spherical projectile fitting the bore. Comparing the calibre and weight of projectiles, it will be seen that the Prussian and French 4-pounder correspond with the English 9-pounder, though the weight of the English gun is 8 cwt. against $5\frac{1}{2}$ cwt. of the Prussian gun and $6\frac{1}{2}$ cwt. of the French. This would, at first sight, seem a disadvantage; but English horses are more powerful than continental, and two or three cwt. on wheels, divided between six horses, is not a matter of much moment. Moreover, the weight taken off the gun has generally to be added to the carriage to resist the increased violence of recoil from a light gun. The disadvantage of weight is more than compensated for by the increased charge and power of the English gun: indeed, many British artillerists regret that the projectile was not elongated so as to weigh 12 lbs., which would give a much more effective capacity of shell; and though the initial velocity would be less, yet the terminal velocity would be greater at 2000 yards and upwards, even if fired with the same charge,—because the 9 and 12-pounder shells exposing only the same sectional area of resistance to air, the latter has greater weight to overcome that resistance. The Prussian gun which throws a 15-lb. shell, and only weighs $8\frac{1}{2}$ cwt., was found an effective and mobile gun; the French 12-cwt. gun, throwing a 25-lb. projectile, being cumbersome in the field.

I fear the English Field-Artillery will be too heavily handicapped with their new 16-pounder of 13 cwt., which is a powerful gun; but the weight of shell being great, very few rounds can be carried into action.

The Prussians, during the war, confined themselves to the use of common shell. The practice of the Quack, who uses only one kind of pill for the destruction of men, is admitted by the Prussians themselves to be inapplicable to the varying circumstances of war, which demand the occasional use of shrapnel as well as common shell. With the introduction of the former, for which a time-fuze is most suitable, the Prussians must follow the English through the difficulties they have overcome.

AMERICAN	30-pr. M. L. Parrott of 15.7 cwt.		10-pr. M. L. Parrott of 8 cwt.		3-inch M. L. ordnance of 7.3 cwt.	
	3.67	2	0	19	0	11
	0	19	0	10	0	0
	3.67	2	0	19	0	11
	420	810	2460	1680	2100	2350
	2600	2850	1100	4350	1565	3760
	400	800	1150	1550	2000	2800
	3000	3200	3000	3200	3000	3600
	0.45	1010	1310	1625	18	5
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The Prussians used only a percussion-fuze requiring no adjustment. The French time-fuzes were almost invariably short-set, and the projectile comparatively harmless.

But I am of opinion the main difference lay in the man and his training. Was the French gunner educated up to his weapon? The Prussian system of universal service forces into the ranks of their artillery a very large proportion of highly-educated, intelligent men. It was an easy task to select those who combined intelligence with natural quick sight and steadiness of nerve, and entrust the pointing of guns to these men only.

The French army, like the English, being recruited mainly from the poorer and less-educated classes, it is more difficult to get this selection of marksmen. In the British service it has not yet been attempted, and thousands of pounds sterling are fired away by men who may be short-sighted or too illiterate to read the figures on a tangent scale or time fuze. In the French service there was an effort to remedy this by selecting *pointeurs*; but the character of the modern French seems to place them at a disadvantage in the use of arms of precision, and the old *Fureur-Française* of historic chivalry has a tendency to waste ammunition.

If I may venture to form an opinion, and be permitted to express it, it appears to me that Canadians are naturally good gunners: those of English descent are well educated; the agriculturists, good drivers; and the lumbering populations, athletic, hardy, self-reliant, and full of shifty expedients. The French *habitan*, also, whether it be that he is more directly descended from the old Norse-Norman type, or that two centuries of residence under the rigours of a climate as severe as that of Scandinavia, the original cradle of his race, have cooled down his excitability and given him the character as well as something of the *physique* of the Teuton—whatever be the cause, he makes a good soldier: he is very amenable to discipline when he believes in his officers; and I cannot but have confidence in the military future of a force in which are happily blended the descendants of those who fought under Wolfe and Montcalm. Past fields of victory, gained by combined French and English Canadians on this continent, point to the same conclusion.

TACTICAL.

The first Artillery tactical consideration is mobility, without which there can be no application of tactics in the field. How long since Marmont wrote, "Le premier mérite de l'artillerie, après la bravourie des canonniers et la justesse du tir, c'est la mobilité"? And yet the French had no practical mobility for modern war. They had no means of carrying the gunners (except for the few horse-artillery of the guard). Their light guns, well horsed, could move with

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facility; but the men were carried on ammunition-wagons, which had to be left far in the rear, out of fire. A gun without gunners is a body without a soul.

Until the present year the English and French were the only two powers who retained this antiquated system. The Prussians carry sufficient gunners to work the gun on axle-seats and limber-boxes. The Bengal Horse-Artillery system of carrying gunners on the off-horses might, with advantage, be introduced into Canada. No horse-holders being required, a minimum of men and horses are brought under fire—casualties in either being supplied from the ammunition-teams and detachments in rear. Space will not permit me to go into details of artillery tactical lessons; suffice it to say, generally, that the last is the only war in which both sides have been completely armed with breech-loading small arms and rifled cannon. Previous struggles shew us chiefly what to avoid; and though general principles remain unaltered, their application must not be fettered by the old stereotyped idea that artillery must conform to its infantry—for, as a rule, the limit of infantry-fire is the commencement of modern artillery efficacy. Field-artillery tactics may be broadly considered under two heads:

1st. Divisional, or supporting the infantry or cavalry division, paving the way for its advance or covering its retreat;

2nd. Army Corps, or Reserve, acting and striking *en masse* on the key of a position, in obedience to the will of a master-mind. Artillery action, therefore, more than ever, requires an artillery head.

DIVISIONAL ARTILLERY.

In the Prussian army four field-batteries are attached to each division of infantry, and two Horse-Artillery batteries to each cavalry division; but half the above might be sufficient in a wooded country, with bad roads, especially when the artillery is as bad as the roads.

The Lt.-Colonel commanding divisional Artillery should, as a rule, remain with the divisional general, with whom he ought to be *en rapport*, and transmit orders to battery-commanders by his field-aides, the divisional Artillery Adjutant and Quartermaster, keeping a trumpeter with him. Army-signalling by lancer-escorts has not yet been tried for directing concentration of fire in the field.*

* Practical Artillery R. U. S. Institution Papers, 1871.

It may be desirable for the Lt.-Col. in command, after receiving definite instructions from the divisional General, to place himself at the head of the two or more batteries of divisional Artillery, and work them as one powerful battery under his own supervision; or it may be preferable to detach a battery to each flank, and so obtain a cross-fire or concentration from widely separated batteries. A battery on each flank is more convenient, also, to cover a deployment or change of front; during which, it must be remembered, the infantry-fire is dead. While the battery on the pivot-flank can continue its fire without intermission, that on the reverse flank should trot into a new position to do so, long before the infantry columns have deployed to deliver fire, or melted into skirmishers. But at all times considerable freedom of action should be given to a battery-commander, who, it must not be forgotten, holds a tactical unit; and, if he is a man of decision, will not let slip golden opportunities of action by any undue waiting for orders which may have miscarried in the confusion of battle. He should, however, remember the golden rule of Taubert, i.e.: "Divisional Artillery, like Divisional Cavalry, is merely an auxiliary arm, and that the infantry, and not the artillery, is the chief element in an action. It is, therefore, the duty of that artillery to comprehend the object momentarily in view, with quickness and accuracy, and powerfully to support the infantry in combat."

The following simple practical rules may be of assistance to battery-commanders and others whom it may concern:

1st. *If you cannot march you will never fight.* A few galled, lame, or broken-down horses among your teams, mean the disgrace of abandoning a gun or ammunition-wagon.* In this case prevention is the only remedy, which a steam-power commander cannot ensure, unless in time of peace he has forged a chain of responsibility, every link of which bears a share of steady strain, from the subalterns commanding divisions, the sergeant in charge of sub-divisions, down to the individual driver.

2nd. *Your collar-maker, shoeing-smith, and wheeler, are very important personages,* and should be well supplied with tools and materials. Misfitting harness, that would produce many galls, seems to be inevitable with Volunteer batteries turned out suddenly.

3rd. *Your limber-gunners must be able to lay their hands on every article in the limber-boxes, 2 and 3 greasing wheels, screwing-up bolts, &c.*

4th. *As you generally have to commence the fight, never lose an opportunity of getting your guns near the head of the column of march, except in a wooded or close country. Under all circumstances, in addition to the eclaireurs in your front, have a couple of intelligent mounted markers, non-commissioned officers, well in advance, to seek out passages over ditches, swampy ground, &c.*

* Not so with cavalry, when a sore back means only a dismounted trooper.

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8th. *Procure maps, even when familiar with the country,—they are necessary for directing others,—and habitually use them, folded the size of your sabbatuche.*

6th. *Note carefully every cross-road or lane, as a means of breaking away to a flank, from which you will best be able to assist your infantry deployment by partially enfilading the enemy's line.*

7th. *Avoid the converse of the above, that is, getting jammed up behind the leading battalions of infantry, whose deployment will probably be checked unless you cover it, while the rear battalions press up and crowd round you, restricting your action.*

8th. *Keep an eye on your neighbouring infantry, with a view to mutual support in case of a rush by the enemy. Escort-duty of guns is distasteful, unless there is a strong feeling of camaraderie for the artillery. Infantry are unable to keep up, and, losing sight, perhaps, of both the guns and their own battalion, wander off, disgusted. Cavalry are little use against a resolute fire of skirmishers. Canadian militia-batteries have only 4 guns. Two gattings for firing infantry-ammunition would make them self-supporting, and take the place of the almost obsolete case-fire. The proper escort for guns would be the coming cavalry!—the long-talked-of mounted rifleman; and their place, the exposed flank of the battery, dismounted and under cover when practicable. If they formed part of the establishment of the battery, they would be doubly valuable filling casualties at the guns, or getting them out of difficulties with breast-barnes, which they should carry on their riding-horses.*

9th. *Leave your ammunition-wagons under charge of the Quartermaster Sergeant, to follow at a distance, taking advantage of accidents of ground, and replacing expended ammunition by sending up wagon-limbers to be exchanged for the empty gun-limber, which, when refilled, can again come up.*

10th. *In advancing into action, the commander rides several hundred yards in front, to select a position and avoid a cordon-sac; he is accompanied by his trumpeter and a mounted marker from each division to assist as range-finders, carrying a pocket sextant and a measured piece of fishing-line on a reel, to take a base on Colonel Drayson's plan. The battery is brought up, silently directed by the sword-arm-signals of the commander, who will endeavour to bring up guns without being seen by the enemy, unlimbering in rear of a slope to avoid the teams appearing on the sky-line, and running the guns up by hand when practicable.*

11th. *The points for consideration of a position are, in order of importance:*

- (a) *Efficacy of fire;*
- (b) *Cover for the pieces and limbers. If possible, the reverse of a gentle slope permitting guns to be withdrawn till the muzzles only can be seen; best fulfil this condition, or 20 minutes with the entrenching-tools will give cover if no hedge or bank is available; a screen not even bullet-proof gives confidence;*
- (c) *Position of the other troops, your own, and the enemy;*
- (d) *Facility of advance;*
- (e) *Facility of retirement.*

These conditions are seldom united in an equal degree. The commander must, at once, decide which is the most important to secure the object of the engagement and which to give up as least essential. No position can be called a good one that does not fulfil the first condition.

12th. *Avoid unmasking the position by opening fire until a worthy object is within range, which should not be above 2,500 yards, the limit of field-glasses by which the results of fire can be ascertained. Every Artillery officer should carry a field-glass, as the staff do.*

13th. *Open fire deliberately from the leeward gun, firing a little short of the estimated range, increasing and correcting the elevation of the remaining guns, firing more rapidly as the range is ascertained or the foe comes to close quarters; but never waste ammunition, which encourages an enemy, unsteadies your men, and is difficult to replace. "If ordered to fire (uselessly, in your own judgment), obey; but fire as slowly as possible." * Opening fire at too long ranges is the vice of all arms and all armies; restrained fire raises the confidence of those who practice it, and none can do so more steadily than the English, while it depresses those who have to advance on a comparatively silent foe.*

14th. *"Guns should bear on that arm of the enemy's force which threatens most—as a rule, the enemy's infantry and cavalry, rather than their artillery." When you do fire on an opposing battery, not in self-defence, but to save your own infantry being shaken before a contemplated assault by the enemy, let it be understood in your own battery that you concentrate on their centre gun (common shell and percussion fuzes); and when silenced, turn attention to that on its right, then left, and so on.*

15th. *Guns being useless while limbered up, and a change of position necessitating a fresh estimate of range, the number of changes of position in action should be a minimum and the pace a maximum, provided it is steady.*

16th. *Having a favourable position, keep it until the enemy retires beyond 2,500 yards or your own troops mask your fire; in either case, advance to within 800 yards of the enemy, and press his retreat.† Should he advance within 800 yards, it is, in most cases, advisable to retire to about 2000, if the ground offers a second favourable position. 800 yards, or thereabouts, being the effective limit of infantry-fire, is the commencement of artillery efficiency. It may be necessary to sacrifice guns and gunners to save a broken infantry.*

17th. *The subaltern's command of two guns should never be separated: they are battle-comrades, and form as complete a unit as an infantry company. They are often detached from the battery for advanced guards or quasi outposts. It is not good for a gun to be alone: alternate fire is essential.*

* Orders of Frederick the Great to his Artillery.

† Horse-Artillery can readily follow in hot pursuit, except when the action has been a very severe one, as was the case at Waterloo, where Capt. Mercer's gallant troop were too crippled to reply to the "tally-ho!" of a sporting staff-officer.

APPENDIX.

ARTILLERY OF THE ARMY CORPS AND RESERVE ARTILLERY.

1st. Besides the divisional Artillery, each army corps should have, under the artillery commander on the staff of the army corps, a force of 4 or 6 batteries, according to circumstances, such as character of the country, discipline and training of the infantry. Raw troops require a large proportion of good artillery: bad artillery or good artillery badly handled is only an encumbrance.

2nd. A general army reserve of guns under the artillery commanding-officer on the staff of the commander-in-chief, to strengthen the artillery of any special army corps, for a decisive blow, or to be held in readiness (not immediately in rear, but to a flank) to advance and occupy the point of attack, and if carried to press retreat. A portion of the divisional guns may be taken to strengthen the army corps or reserve; but they must be a most self-reliant infantry who can with indifference see the removal of their guns to support another corps. We are all familiar with the phrase common to peace parades, "take those dash'd guns out of the road"; and some of us have heard the war-cry, "for God's-sake bring up the guns."

A General who fails to bring his reserve artillery into action gains an indecisive victory, is defeated, or retires encumbered with useless guns, unless he has a very inferior enemy to contend with.

"With regard to the employment of reserve artillery, and artillery generally (especially horse), it must never be forgotten that no arm is capable of bringing such rapid and important assistance as field-artillery." * * *

"Let us suppose the case of an army engaged in battle with the enemy, and that an army corps a day's march or so distant is on the march to its assistance: the infantry of this corps can obviously take no essential part in that day's battle; the horses of the cavalry will arrive too tired for an effective charge; but light field-artillery, particularly horse-artillery, can give efficient assistance; for, directly the guns reach their position, the horses get time to take breath and rest while

the guns are in action. For the same reason no arm can take more rapid advantage of any fault committed by the enemy than light field-artillery, as it can move as quickly as cavalry to the spot where it is wanted, and, having unlimbered, can throw its projectiles rapidly into the enemy's ranks."

A vigorous artillery initiative has the advantage of not only covering and gaining time for the deployment of your own troops, but obliges the enemy to display his position and probably his intentions.

"In the Prussian service, since 1868, the reserve artillery has been termed corps artillery. Far from being a reserve, this artillery is really like the divisional artillery, an advanced guard. Its duties are really those of an advanced guard. The duty of an advanced guard is to see the enemy first and come first into action. Artillery, from its range, ought to be the first arm to attack an enemy; an advanced guard cannot perform its duty of covering the deployment of the army unless it be powerfully supported by artillery."

"The greatest fault a General can commit is to have reserve artillery at all: the preparation of attack is the function of artillery. Looking to the enormous power of its fire, nothing should prevent the concentration of all available means: every battery, every gun, should be in position; one gun may even make a difference. It is by acting in accordance with these principles, and placing in line as many batteries as possible, that we have won all our victories." This is the Prussian opinion of Von Becker, which is more a question of the meaning of the word reserve than of the principles, borne in upon him probably as much by the mistakes of the Prussian artillery, who were too far to the rear in 1866, as well as from the success of shoving to the front as they did in 1870. The practice may be comparatively new in Europe; it is old in the east, where the British artillery in India have practiced it for more than a quarter of a century,—possibly because artillery officers have not there been excluded from their share of the command of divisions of all arms.

The dictum of the first Napoleon, that "he who has the address to bring suddenly and unknown to the enemy an

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unexpected amount of artillery to bear upon the most important points is sure to carry them," remains correct in principle, but is to be acted upon not in a spirit of servile imitation, by an agglomeration of guns at close range, but by a concentration of fire from numerous batteries echelloned at considerable intervals, but not so wide apart as to lose unity of action under one head. The echellon provides against enfilade, facilitates change of front, bewilders an enemy as to range, and is convenient for advance or fighting retirement.

The point to be played upon, and a breach in the enemy's line effected for the assault of the infantry, should (other things being equal) be selected with the view of driving him from his communications with his base, and so gaining a decisive victory.

Prince Hohenlohe Ingelfingen, Commandant of Artillery of the Prussian Guard, and many of our own artillerists, consider concentration of fire from widely extended batteries impracticable.

It would be presumptuous in me to express an opinion to the contrary after the Oracles had spoken: unfortunately, I broached the subject before the conclusion of the war, in a paper before the Royal United Service Institution in London, February, 1871. My readers must judge for themselves whether on this much-wooded continent the massing of guns in contiguous lines has been found practicable or desirable, as on the open fields of France. In certain defensive positions, could not the electric telegraphs of the country be utilized,—if not, the army field-telegraph, so as to concentrate fire from batteries dispersed over a considerable arc?

"There is nothing which tends to produce so great a moral effect as a heavy cross-fire of artillery. The best troops in the world get shaken and demoralized by such fire. Loop-holed houses or walls rapidly become untenable, and the shells search out the trenches or rifle-pits. The effect of a given number of guns placed so as to bring a converging fire on a portion of the defenders' position is very much greater than if they merely brought a direct fire. A direct fire may be more or less guarded against; but a cross-fire on a position produces the moral effect of an attack both on a flank and in front."

The rapidity with which villages, often the key of a position, become untenable under artillery fire, is a marked feature of modern battles. "General Woyna (7th corps) opened fire on Flanville, situated at a distance of about 1200 yards. The French infantry held this position strongly, and a close musketry fire had no effect on them. After a very short time the two batteries detailed for this purpose overwhelmed the village with shells; the houses took fire, and the infantry abandoned them; the 53rd regiment then advanced and took it. The guns were next turned on Coincy, which in a short time also became untenable, and the French retired. The German infantry, during these operations, remained with ordered arms."

"That arm which at any given instant of an engagement becomes the chief arm should always be allowed to select the ground most favorable for its position or for its advance."

"At all stages of the engagement at long ranges, 2,000 to 800 yards, artillery will be the chief arm, and should not be deprived by the other arms of the most favorable position for its action. Not only would it be disadvantageous for the artillery, but still more so for the infantry and cavalry."

On the other hand, the artillery should yield choice of positions for advance at close ranges.

IN CONCLUSION.

"It is essentially requisite that unity of action should be preserved amongst batteries of artillery, and that they should act together in bodies which have some cohesion and are under some definite command. If this be not carefully observed, much of the advantage of massing artillery is lost."

"The artillery engagement south of the Sadowa wood did not proceed so favorably; a want of unity in the direction of the artillery was painfully evident on this part of the field. *Two commandants* of regiments were on the spot; but the eleven batteries then present belonged to five different artillery divisions, some of them to the divisional artillery, and some to the reserve. This accounts for the want of unity of action at this spot: some batteries advanced perfectly isolated, whilst others retired behind the Bistritz at the same time."

"Exactly a similar complaint was made by one of the French corps-leaders in 1870. His artillery belonged to seven different regiments, and there was only one field officer who had ever done duty with any of the batteries

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before." Hence the necessity of intelligent artillery organization. An artillery organism without a head, evolving itself out of a conglomeration of atoms and protoplasmas, would puzzle Professor Tyndal.

The following is from a *precis* of modern tactics, by Major Home, Royal Engineers :

ARTILLERY ORGANIZATION.

The artillery of an army is commanded by a general officer, who is styled the commanding-officer of artillery. He has to assist him a staff which is composed of two branches, one being charged with the duty of Adjutant-General, or personnel, the other being charged with the matériel; the head of the matériel branch is termed the director of the Park; both these subordinates are, if requisite, helped by other officers of artillery.

The artillery of an army-corps is commanded by a Major-General, or Brigadier-General, assisted by a similar staff.

The artillery of a division is commanded by a field-officer, who has a staff officer charged with both the personnel and matériel of the division.

The commanding-officer of artillery with an army is charged not only with the command of all the artillery, but also with the supply of the 1st and 2nd reserves of small and great gun ammunition, as well as with the important duties which devolve on that corps at sieges.

JOMINI.

The most suitable means of obtaining the greatest advantage from the artillery is by giving the chief command of that arm to an artillery-general who is not only an artillerist, but a good tactician and strategist. This General disposes not only of the general artillery reserve, but also of one-half of the guns attached to the division and army-corps. He can thus, in concert with the general-commanding-in-chief, determine the moment and place where large masses of artillery can best contribute to victory. But such a massing of artillery must never be made except by order of the General-Commanding-in-Chief. The commandants of artillery and engineers have always made a portion of the staff of the army.

VON MILLER.

The commandant of artillery should be endowed with great coolness and intelligence. He should be close to the commanding-officer of the division, so long as his presence with his batteries is not absolutely requisite, in order that he may follow the course of the action and subordinate the artillery to its movements.

NAPOLÉON.

It is the duty of the commandant of artillery to know the whole of the operations of the army, since it is his duty to supply arms and ammunition to the different divisions composing it. His connection with the commanding officers of artillery at the advanced posts should keep him aware of all the movements of the army, and the direction of the Great Park is subordinate to these movements.

LE BOURG.

The General commanding the artillery has authority over all the troops of the arm. He may, with the approval of the General commanding, make all such changes in the personnel and matériel as he thinks advisable. He issues orders to the Generals commanding the artillery of army-corps, and receives

their reports; the central Reserve and Grand Park receive orders only from him; he fixes the depots as well as the marches; finally, he sees to the supply of the army from the parks and convoys.

He lives close to head-quarters, and when marching to attack an enemy he accompanies the General in all his reconnaissances, in order to select the places most suitable for his guns. In action he remains close to the General to receive his orders, if he does not himself direct the movements of the reserve at decisive moments.

The chief of the artillery staff receives from the staffs of corps and divisions reports and states of their situation, both as regards personnel and matériel. He sends them all orders issued by the commanding-officer of artillery and the general staff of the army. The Director of the Park is charged with the supply of ammunition and all articles required for repairs or exchanges, if these cannot be supplied by the corps and Divisional Parks. He keeps the commanding-officer of artillery aware of all expenditure of ammunition. The commanding-officers of divisional artillery receive orders from the Generals commanding the divisions to which they are attached as regards their marches and the military position they should occupy; but as regards interior economy and matériel, they receive orders from the commanding-officer of artillery, whom they keep acquainted with changes from day to day, the state of the supplies, and their wants.

GERMAN ARMY.

Although the cannon is the arm of all artillery, yet the diversity of object and manner of employment, as well as the different kinds of guns dependent thereon and the various modes of serving them, have necessitated a different instruction for the men, and a division of all into two categories—siege-artillery and field-artillery, which last is divided into field and horse, the latter provided with mounted gunners. This division, however, concerns the men of the corps, not the officers. The artillery officer is not destined for one only of the categories mentioned above, but rather for employment in either, and is educated accordingly. He is, as it were, a universal artilleryman.

MAY.

The leader of the artillery of an army should be a General of the first class.

Everything points to the fact that of all arms field-artillery is not a force to be extemporized on emergency; and Prussian experience of artillery failure in 1866 (for there has been Prussian failure as well as French failure) shews, in the words of Captain Hozier, that "a large infusion of raw element into field-artillery, to strengthen it, defeated its object by crippling the efficiency of batteries."

The war of 1870 has, perhaps, been already over-written; but I have sifted my facts on the very ground of the theatre of war, among the actors themselves; and I have not neglected to avail myself of all the sources of information at my disposal.

The following writers and works have been more or less consulted, and in some cases quoted, especially in the

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appendix and practical rules, which were compiled mostly
for the benefit of my own officers, and were too technical to
read before a mixed audience, and too important to be
dogmatically published without support from modern military
writers of ability, viz.:

Franco-German War, by Captain Hozier.

Do. do. by Elihu Rich.

Colonel Owen, R.A.

Major LeGay Geary, R.A.

Captain Hime, R.A.

Conference Militaires Belges.

Modern Tactics, Major Home, R.E.

General Von Hindersen, trans. Capt. Clarke, R.A.

Militar Wochenblatt.

Taubert.

Hohenlohe.

Major Fox Strangways, R.H.A.

Lieut. Maurice, R.A., and others.

The last and most important lesson we have to lay to heart,
as citizens and soldiers, is that neither science, strategy,
technical or tactical skill, can avail anything to a people who
subordinate these things to the pretended necessities of
political faction.

PART II.---SIEGES.



SIEGES,

AND THE

CHANGES PRODUCED BY MODERN WEAPONS.

BY LT.-COL. STRANGE, DOMINION INSPECTOR OF ARTILLERY.

IN the last paper I had the honor of reading before this Society, I endeavoured to give an artillery retrospect of the last great war; but an evening-hour I found too short to give you more than a tactical artillery sketch and some technical details as to the quality of the guns used. I propose, this evening, to resume that part of the subject which treats of modern sieges, commencing with a cursory glance at ancient sieges, in which you will excuse me if I descend to elementary principles, with which a majority of you are, doubtless, familiar, but to which it is necessary to draw the attention of some of my non-military audience, to enable them to get a clear insight into the changes produced by modern weapons.

The subject naturally divides itself into

INVESTMENTS,
BOMBARDMENTS, and
REGULAR SIEGES.

If your patience will permit, I will conclude with a few remarks on the famous fortress in which we live, the

Gibraltar of this continent, its present armament—or, I speak truth, its present disarmament—and the part it might yet be called upon to play as the gate of British North America,—the last spot on which the old flag we love once floated, when it had been swept from this continent by our foes in 1775, and waved alone on Cape Diamond; from thence it has been carried, by the indomitable courage of our race, from the Atlantic to the Pacific slopes. It may be trite, but none the less true, that history repeats itself.

The primary object of fortification was to enable the few to hold their own against the many,—the weak against the strong; to prevent surprise, and gain time for organized defence. Before the days of artillery, massive continuous walls protected unvarlike citizens from the sudden incursions of fiercer foes. The great wall of China against the Tartars, and that of Agricola to keep out the Picts and Scots, the walls of Babylon and others, were of this character. The besiegers raised a large mound of earth to command the walls, and surrounded the city with lines of circumvallation to confine the garrison.

The battering-ram was the chief agent in breaching ancient walls. A huge beam, sometimes 100 feet long, with a metal head, was horizontally suspended by ropes, generally under a shed, to protect the assailants, and made to oscillate by manual power, striking the wall until it crumbled to ruin. Josephus says that no walls were able to resist this weapon. The upper story of the shed or moveable tower (the beffroi of the middle ages) was occupied by archers, who could command the walls of the besieged. In all battering or breaching, the weight of *missile* or striking object and velocity of impact are the two factors producing the result.

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divided by force of gravity, equals the work stored up in the missile, $\frac{W V^2}{2 G}$, if you will forgive the use of formulæ.

In the battering-ram, the force of gravity was in suspension; the weight was enormous, the velocity being low, compared to the 1,300 feet per second of a projectile from a rifled gun. The vibration produced by the quick succession of blows on the same spot produced the results which, in modern days, are effected by breaching-batteries at long range.

The first step in defence against battering-rams was a ditch, which prevented the engine being brought near enough to the walls; and the counter-step of attack was to descend into the ditch by excavating a covered gallery, mining under the walls, and supporting them by beams of timber, which, when set fire to by the besiegers, crumbled away and caused the fall of the unsupported wall.

The defence against this species of attack led to the Matchicouli gallery, or projection of the upper part of the walls, giving that picturesqueness to military ruins which, however, those made by the Corporation of Quebec do not at present possess. There were spaces in the floor of the projecting Matchicouli which enabled the besiegers to pour melted lead, boiling water, stones, and arrows, on the assailants at the foot of the wall.

Flank defence was obtained by the projecting towers, in which may be found the germ of Vauban's bastioned trace (plate 1, fig. 1). The larger bastion for artillery, and the flank at right angles to the face of the bastion, enabling it to be seen to its salient, might, perhaps, in these days, be designated as a Darwinian development (fig. 2).

In addition to the battering-ram and the undermining of walls, various engines were used, throwing huge stones and other projectiles, and sometimes the carcass of an

unhappy captive, who was thus set free from his sorrows and sent back to his friends. The Balista Catapulta (see fig. 3) are of the time of Julius Cæsar.

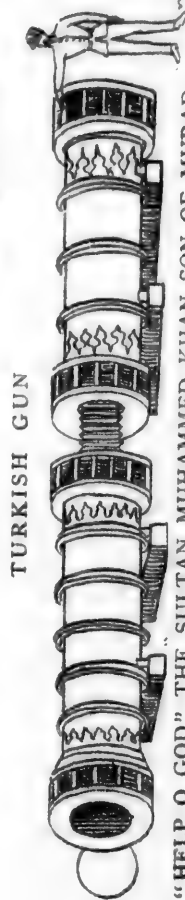
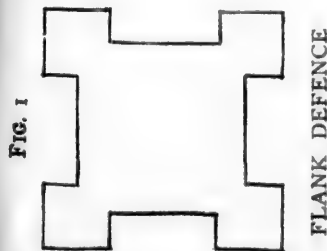
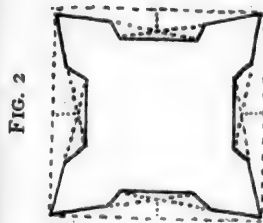
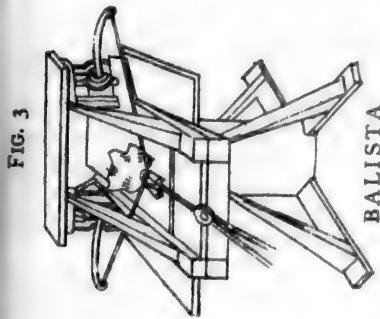
The huge unwieldy cannon cast on the spot by Sultan Muhamed II. for the siege of Constantinople, in 1451, were, from their cost and immobility, seldom imitated (fig. 4, plate 1). Some of them remain at the Straits of the Dardanelles to this day, monuments of the skill and energy of a Mahomedan people, once the terror of Europe, who still linger on its confines.

Passing by the feudal castles and those of the predatory chieftains of the middle ages, which occupy more of a personal than national place in military history, being, for the most part (for rapine and security from its consequences), built on isolated hills, they were seldom found in the fertile valleys that cause the confluence of rivers and the natural roads of traffic. Such valleys were the natural sites of free fortified cities, whose sturdy burghers were not, as yet, too effeminate to defend their commerce. Soon, however, with the consolidated power of kings, artillery, and standing armies, these cities became regular fortresses for defence of frontiers, as well as magazines and *dépôts* of stores, serving also as bases of supply when invading a neighbouring territory. The walls so easily destroyed by artillery had to be sunk and covered with earth; and these walled ditches were given a trace, so that every part could be seen and flanked by some other part. This led to the outline of Vauban's system, with its projecting salients; and the great engineer was the first artillerist to find a means of attacking his own and kindred systems, no longer at the mercy of direct fire,—so true is the dictum, "*Pour être ingénieur on doit surtout être artilleur.*" At the siege of Ath, in 1697, Vauban introduced enfilade ricochet fire, which system gave the advantage to attack over defence. By erecting batteries on the prolongations of the long faces of his salients, using a

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"HELP O GOD" THE SULTAN MUHAMMED KHAN SON OF MURAD

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reduced charge and high elevation, the shot were made to bound along the line of the enemy's works, destroying material and men. When the guns on these long faces were dismounted or silenced, he made his zig-zag approaches, directed outside the neighboring salients, on the capitals of those he was attacking; so that these *boyaux* could not be seen into or enfiladed, as the long lines of the fortresses had previously been. Gradually, as the trenches reached the escarp or wall of the ditch, breaching-batteries were established there.

A breach and lodgment was effected, and each captured out-work became, in its turn, a *point d'appui* for the attack of the next; so the fall of the place, under ordinary circumstances, became a question of time, unless in such naturally strong positions that the prolongation of the faces fell on marshes or rocky soil unsuitable for the excavation of trenches or batteries.

In the days of *Le Grand Monarque* sieges were so prolonged, and the reduction of a fortress considered of such consequence as to become the object of and occupy the energies of a whole campaign. The rapid fall of French fortresses has made us forget that Sevastopol was the sole trophy of united French and English effort during the Crimean campaign, and that the quadrilateral of northern Italy stayed the tide of conquest of Napoleon III. and Victor Emmanuel. Before these days, however, the military genius of Prussia, under Frederick the Great, and France, under Napoleon I., had learned to mask fortresses and decide the fate of empires in the field.

There are some who argue, from the rapid downfall of French fortresses, that all fortifications are useless; that the cruel effects of bombardment, complete investments, and famine, have relegated sieges to the history of the past; and that fortification is a useless provocative of human suffering. I wish, with all my heart, that I could

think it were so. But there are circumstances where no amount of disarmament and self-abasement will purchase for a people immunity from suffering, even though they hold lightly their own manhood and the surrender of the birthright of their children, purchased with the blood of their forefathers. They must endure, in pocket and person, the rapacity of their invaders, and contribute to the support of war for their own conquest; whereas a little foresight, a little self-denial in peace, will produce that preparedness for war which is the palladium of national security.

It is not safe to jump at conclusions without due consideration of the causes that have produced certain results.

The practical answer of the Germans, after their experience, is to strengthen the most important strongholds they have wrested from the French, building detached forts, which keep an enemy at a distance.* Let us hear a French opinion, even in the bitterness of defeat :

“ La résistance souvent courte et inefficace de nos places,
“ dans la guerre que nous venons de soutenir contre les
“ Allemands, a dû nécessairement frapper l'opinion publique,
“ et il est à craindre que l'on ne soit tenté d'en conclure à
“ l'impuissance de la fortification. Cependant la cause de
“ ces faits se trouve bien plutôt dans le manque des éléments

* NOTE.—There are at this moment 10,000 workmen employed on the forts at Strasbourg and a large number at Metz. The smaller fortresses in places of no strategic importance are to be dismantled. A useless number of fortresses absorbs an army of defenders, who must surrender if the more important places fall. Sedan was a mere trap for the French army, from its situation in a basin (plate 4, figure 10), its useless armament of smooth-bore guns, and the political madness which necessitated a line of operations inevitably ending in a battle, with the line of retreat cut off by neutral territory.

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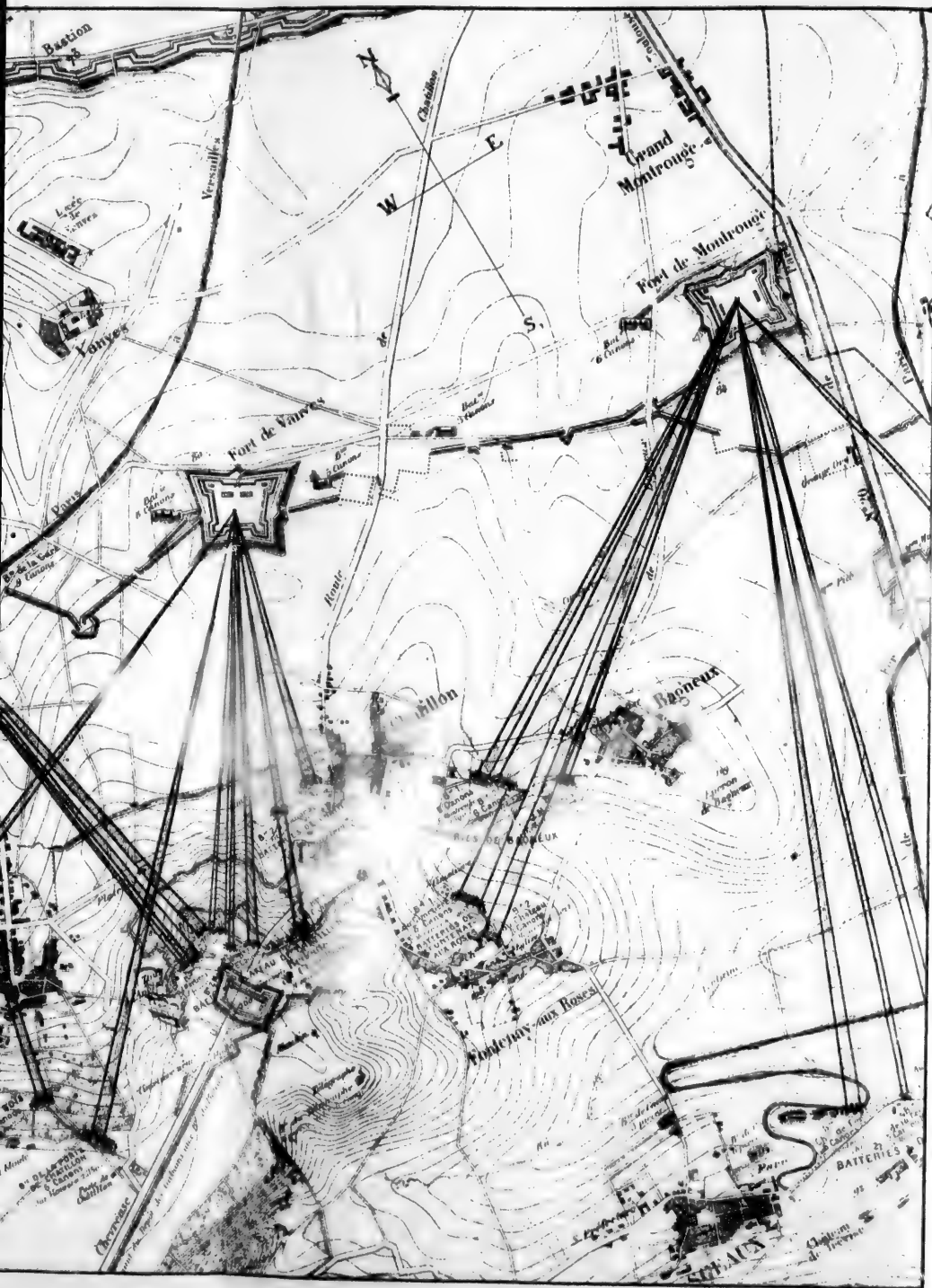
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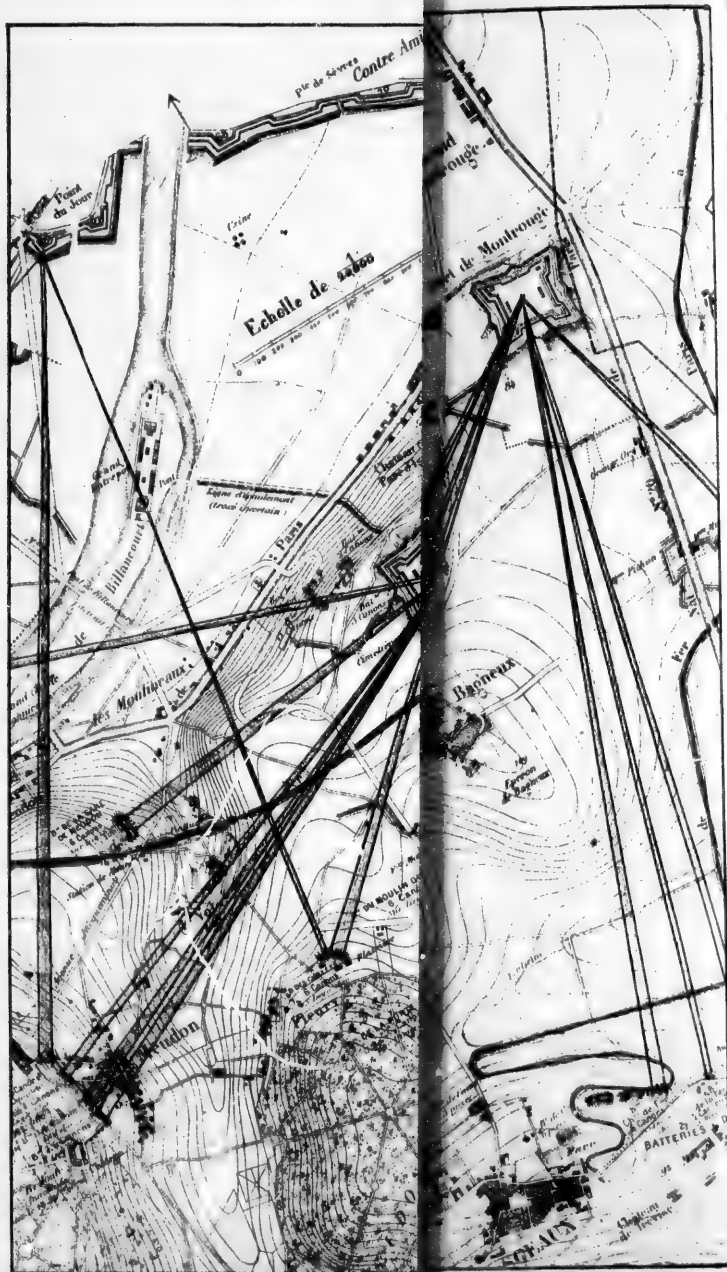
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RUSSIAN SIEGE OF PARIS.

Pl. D.



SIEGE BATTERIES ON FORTS ISSY, VANVES AND MONTROUGE.

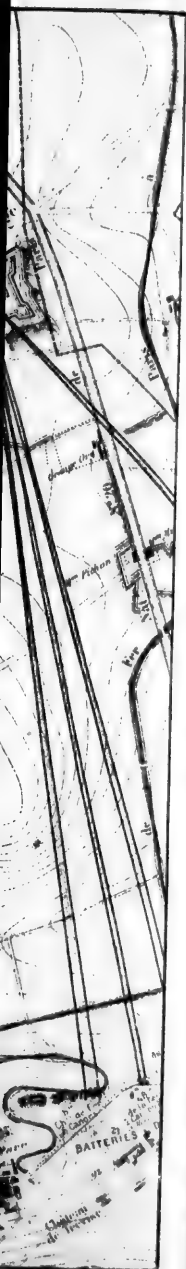


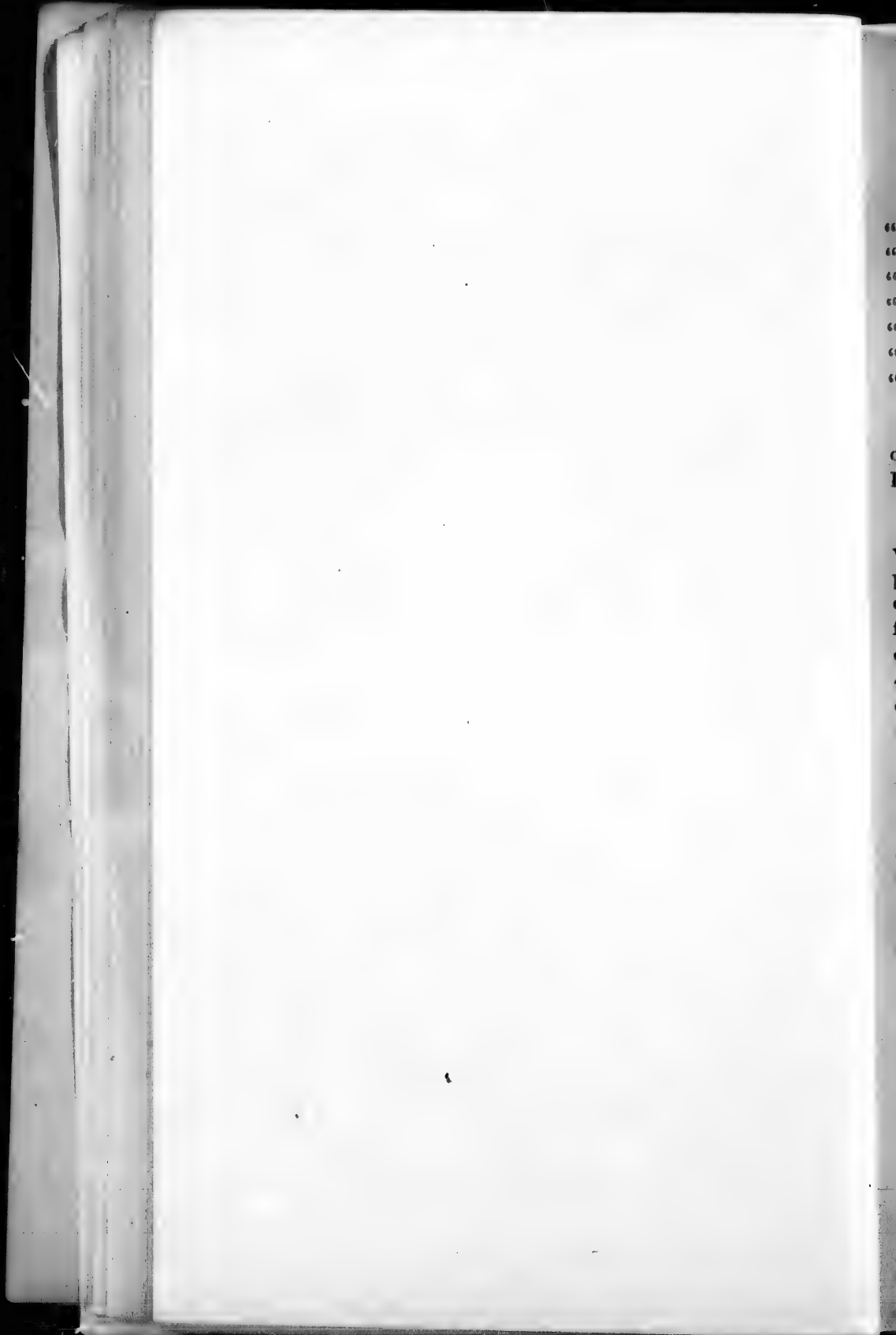
CONVERGENCE OF MONTROUGE.

TABLE No. 1.—German Attack on the Southern Forts of Paris.

POSITION OF BATTERY.	Number of Battery	No. of Pcs.	NATURE.	Range, Meters.	Relative level of Battery and of Object, in Meters.	No. of Rounds said to have been fired.	OBJECTS.
Behind Pavillon de Breteuil, in Park of St. Cloud.	I.	6	{ At first 24-Pcs.; after- wards 12-Pcs.	3,600	+ 72	1,250—25,710	{ Point du Jour and Billancourt.
Left Flank of Terrace of Meudon.....	II.	8	{ 4 12-Pcs.—4 24-Pcs.	3,550	+ 80	15,500—11,600	{ Boulogne and the Seine.
Terrace of Meudon.....	III.	6	2 12-Pcs.—4 24-Pcs.	2,500	+ 80	{ 130 from 12-Pcs. 1,800 .. 24 ..	{ Point du Jour and the North Branch of the Seine.
Do. ..	IV.	6	Do. { 2 12 Pcs. 2 6-Pcs. 2 24-Pcs. 24-Pcs.	2,500	+ 80	{ About the same 2,200 from 12-Pcs. 2,200 .. 24 .. 610 .. 6 ..	{ Fort Issy.
Southern part of Wood of Meudon.....	V.	6	{ 2 12-Pcs.—4 24-Pcs.	2,500	about + 60	1,060	{ Ditto.
South-east of No. V., at Southern edge of Wood.	VI.	6	2 12-Pcs.—4 24-Pcs.	2,500—3,000	+ 73	450 from 12-Pcs. 3,600 .. 24 ..	{ Vanves.
Left Battery on Heights of Châtillon.....	VII.	6	2 12-Pcs.—4 24-Pcs.	2,200	+ 60	3,600	{ Issy.
Plateau of Châtillon, to right front of VII.	VIII.	6	12-Pcs.	1,750	+ 75	4,000	{ Vanves.
Ditto right flank of VII. on Chevreuse road	IX.	6	12-Pcs.	1,840—3,250	+ 75	4,000	{ For enfilading Vanves and Montrouge.
To East of IX., and S. of Chevreuse road	X.	6	24-Pcs.	2,800	+ 60	1,000	{ Probably Montrouge.
Due South of the Village of Châtillon, a little north-east of Fontenay-aux-Roses, (one on each side of the road.....)	XI.	6	12-Pcs.	2,800	+ 16	1,640	{ Probably Montrouge.
Plateau of Châtillon, west of No. VII.	XII.	6	24-Pcs.	3,000	+ 20	3,760	{ Issy and Vanves.
Ditto, west of No. IX.....	XIII.	2	{ 8, 26-in. rifled Vanves, elevation up to 80 degs.	20,800	+ 60 and 70	800 (about).	{ Issy and Vanves.
West of Bagneux.....	XIV.	2	Ditto.	18,500 and 21,850	Ditto.	800 (about).	{ Montrouge.
Terrace of Meudon, between II. and III.	XV.	2	Ditto.	2,240	+ 4	800 (about).	{ Ground front of Fort Issy.
Plateau of Châtillon, to left front of VIII.	XVI.	6	12-Pcs.	2,400	+ 80	1,790	{ French batteries between Issy and Vanves.
S. of Road from Bagneux to Châtillon.....	XVII.	6	Bronze 24-Pcs.	1,300—2,500	+ 75	2430	{ Breaching curtain S. front of Issy, also against Paris.
The Swiss Châlet, N. of Wood of Meudon.....	XVIII.	6	{ 6 short 24-Pcs. 2 to 4 long 24-Pcs.	1,600—3,400	+ 30	{ 2,000 1,100	{ S. front of Vanves and left face of N.-W. bastion.
Wood of Meudon, by Porte de Clamart.....	XX.	8	Long 24-Pcs.	2,500—2,600	+ 45	2,050	{ South front of Vanves.
Wood of Meudon, by Châtillon.....	XXI.	6	Short 24-Pcs.	1,300	+ 22	1,880	{ Montrouge and Paris.
Château de No. XVIII.	XXII.	6	24-Pcs.	2,300—3,500	+ 16	1,700	{ Fort of Issy and advanced works.
Right rear of the Moulin en Pierre.....	XXIII.	4	60-Pc. Mortar.	1,100	+ 20	250	

Pl. D.





“nécessaires pour utiliser convenablement nos forteresses
 “que dans la nature même de leur rôle et des services
 “qu’elles peuvent rendre. Pour qu’une place paralyse un
 “grand nombre d’ennemis et résiste longtemps, il lui faut,
 “en plus de ses remparts, des approvisionnements et une
 “garnison suffisante. Il faut, en un mot, qu’on veuille,
 “qu’on sache et qu’on puisse la défendre.”

The most notable captures of fortified towns were those of Paris, Strasbourg, Belfort, Metz, Thionville, Toul, New Breisach, Schelestadt, and Sedan.

There were two sieges of Paris: the first, by the Germans, was a complete and enormously extended investment, producing scarcity of provisions, combined with bombardment of the town, and a not very successful effort at breaching from a distance a few of the detached forts. Fort Issy, on the south side, was made the focus of gun-fire attack, 46 pieces converging upon it from the terrace and woods of Meudon, the plateau of Chatillon, and the *moulin-en-pierre* batteries.

TABLE I. of the German attack on the southern forts of Paris gives the position of the batteries; shews the number and nature of the guns, range, relative level of batteries, the amount of ammunition expended, and the object of fire. The guns and mortars were all rifled except four 50-pounder mortars. There were in the siege-train also four rifled 21-centimètre mortars, throwing a projectile of 180 lbs.; but no *guns* heavier than our 64-pounders were mounted.

It must be borne in mind that the Prussian B. L. rifled 4-pounder throws a shell 10 lbs.

6	“	“	“	15	“
12	“	“	“	30	“
24	“	“	“	60	“

There were no regular parallels or approaches to attack. Circumstances of ground generally decided the position of each battery, rather than the old rules for placing batteries especially to enfilade, counter-batter, or breach.

Indeed, the *first* point of difference between the late siege and those of former wars was, that the regular approach until breaching-batteries were erected on the escarp, was no longer necessary, from the greater accuracy, range and shell-power of rifled guns, the curved trajectory of which, just clearing the crest of the glacis, could at long range effect a breach (plate 3, figures 6 and 8); while the large arc, of two thousand yards radius, or thereabouts offered a great choice of position.

The Germans generally chose the reverse slope of high ground, so that a slight excavation in rear left the natural surface of the ground for the body of the parapet more solid than any elevated construction (plate 4, fig. 9). Traverses were not dug out to be again filled in, but emplacements for guns cut out of the reverse slope of the hill; the intervening space left as a traverse, sometimes excavated to contain an expense magazine.

Whenever available, the batteries were built a little distance within woods and orchards, which concealed their construction and armament. At the desired moment the trees in the line of fire were half-cut through; the first discharge blew them down, and such as did not impede fire were left on the ground as *abbatis*, their pointed branches towards the front forming an obstacle to *coup-de-main* (plate 4, figure 9).

When necessarily in the open, a sham-battery or screen, when no natural one was available, was thrown up in front of the real battery, at 50 or 60 yards from it, to deceive the

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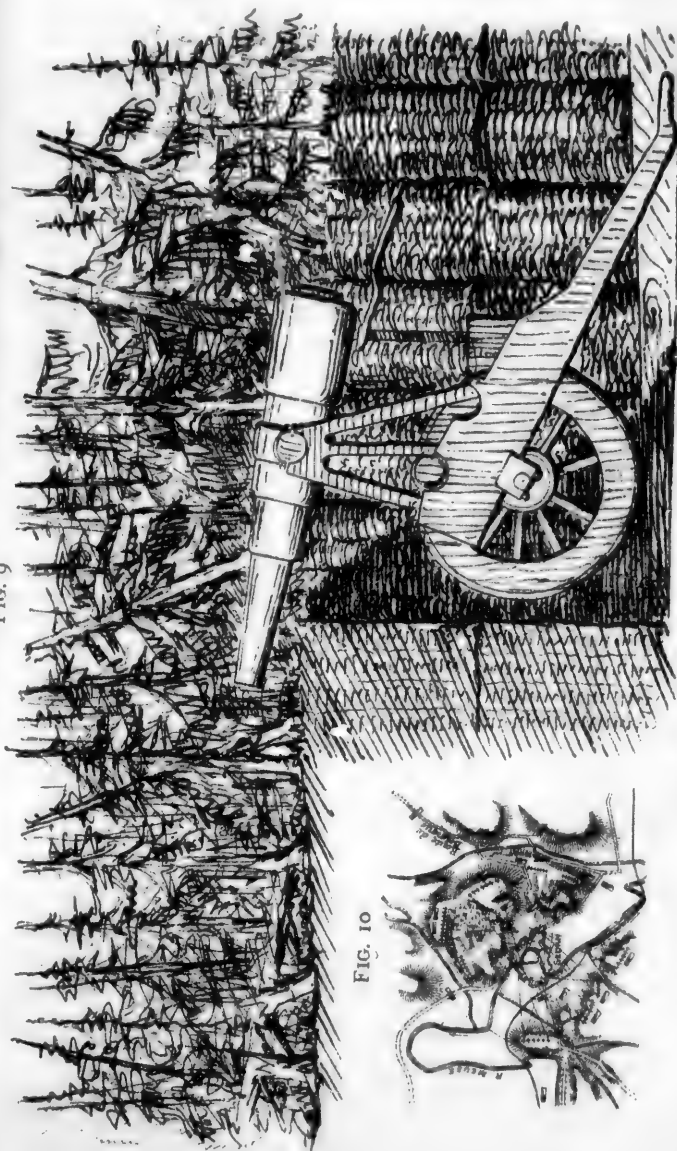


FIG. 10

GUN EMPLACEMENT IN FOREST



enemy and attract some portion of his fire. I was told by *not-distant* eye-witnesses that snow-screens were even on some occasions used, and blank cartridges exploded in their sham embrasures; certainly, piles of firewood, and even brush-wood that happened to be on the spot, had been utilized as screens.

It must not be supposed that the Prussians had a monopoly of military intelligence. In some schools of instruction for the British army, the laying aside of the old system of attack and its stereotyped rules had been anticipated and put into instructional practice long before the first note of war; and Prussian officers have been pretty frequent visitors at our gunnery experiments and Shoeburyness School of Instruction.

Perhaps the *second lesson* of detail to be learnt is the fact that embrasures are funnels directing the enemy's fire into the battery, an evil which increases with the thickness of parapet, due to rifled-gun penetration.

The Prussian siege-guns had an iron bracket bolted on to the ordinary travelling-carriage (plate 4, fig. 9), which raised the trunnions at least six feet above the ground. No man of the detachment is ever under direct fire, except the slight exposure of No. 1 in laying, who, of course, in order to see, must be seen; and, with breech-loading guns firing at high angles, as they would be at long ranges, the breech comes conveniently down for loading.

The French occasionally, in their fortresses, made use of a barbette carriage more unwieldy, without gaining sufficient cover, and not suitable for travelling.

Occasionally the Prussian guns were fired by pointing rods on the parapet, on the same principle as mortars: the wheels were on two long inclined planes (1 in 6), with flanges on the inside; while the trail rested on planks on

the ground-level, which gives increased elevation, the platform resembling that of Colonel Clark, R.A. The guns recoiling, the wheels run up the ascent, and then quietly run down to their former convenient position for breech-loading (plate 4, fig. 9).

As before stated, there were no regular parallels of communication between the batteries; but the accidental cover given by houses, sheds, garden-walls, &c., was always utilized as a covered-way. In the open, when absolutely exposed, narrow trenches, about five feet deep and two feet wide, were run along, affording cover for single file. On the other hand, the batteries were almost always constructed near railroads or on the numerous good high-roads leading to Paris from the rear, affording facilities for armament and the bringing up of projectiles. Thus, construction of batteries on the great highways of the country may be considered as the *third* characteristic of modern attack, rendered doubly necessary to the Germans on account of their great distance from the primary bases of operation in their own country. Possibly the rival importance of munitions *de guerre* and munitions *de bouche*—the fact that every projectile brought to the front meant so much less sausage, so much less bread—was one reason why the process of complete investment and partial bombardment was preferred to vigorous, breaching attack, the Prussians judging that the hearts and stomachs of the Parisians were more vulnerable than their fortifications.

Indeed, the most formidable breach made by the Prussians, which was at fort "Issy," was scarcely practicable, as an assault could not have passed over the parapet by it; and though two adjacent casemates were cut into by curved fire with reduced charges, long shells, and percussion fuses, yet the defenders appear immediately to have barricaded the breach with sand-bags, backed with earth

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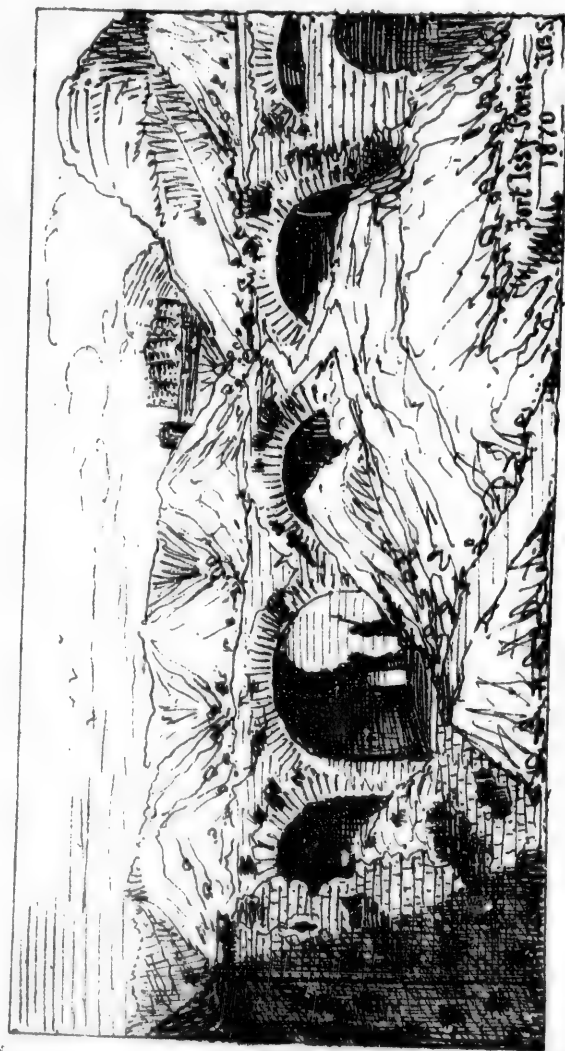


FIG. 11

and stones,—a difficult task, if we remember that the ground was frozen during the abnormal severity of that winter. The powder-magazine of the nearest battery to fort Issy, *moulin-en-pierre*, about one thousand metres distant, was blown up.

The heaviest guns used in the defence at "Issy" were 6½-inch M. L. rifled; and, considering the enormous amount of fire concentrated upon it, the breach seems, in my opinion, to have been not a surprising artillery success. A far more effective breach was made at the same spot (fort Issy) by the French artillery of the Versailles army, at the second siege, with less effective weapons, after the Prussians had gained possession of the best French ordnance (plate 5, fig. 11). The French also suffered from using embrasures more than the German gunners in the same batteries.

The French artillery deserve infinite credit for the manner in which they utilized a quantity of old bronze smooth-bore guns by rifling and making projectiles. In some instances I found old-fashioned guns with the date and arms of Louis Quatorze, which had been so rifled, and done duty in the second siege. The sketch of the breach at fort "Issy" is enlarged from a drawing I made on the spot immediately after the second siege: it is, of course, quite an indefensible breach, and a remarkable instance of the terrific power of modern artillery (plate 5, fig. 11).

The French officer, who looked over my shoulder, said, with a sad smile: "And you, too, our comrades of the "Crimea, have come over to sneer and find fault." "*Væ vidis!*" is an old story with the world in general; but British officers, as a rule, seek to learn their profession by a dispassionate search for truth.

Whatever may be said of the *Garde Mobile* and *Moblots* of sorts who so feebly defended the French fortresses, and yet broke into fierce political strife while their country was under

the foot of the invader, does not apply to the marine, nor to the regular French artillery, a mere handful of whom defended the French fortresses; and this deficiency of regular artillerymen was one great cause of disaster. Garrison artillery is not a showy service, and was, therefore, somewhat neglected in France for the more dashing service of the mounted batteries. I was much struck with this deficiency before the war. The few regular artillery found in French fortresses did their duty to the utmost, and the officers of that branch were gallant gentlemen, of high scientific attainments, from the *Ecole Polytechnique*.

I was told a somewhat characteristic story of a young French lieutenant of artillery, conspicuous for his devotion in the batteries of Paris, who, nevertheless, managed to spend in musical recreation most of the few short hours left for rest. As provisions got scarcer, his meat-ration was reduced to a sparrow per diem; these he kept in a cage at the window near his piano, and fed with the crumbs of his daily biscuit. His landlady anxiously watched him growing thinner and paler, and entreated, in vain, to be allowed to transform his little pets into a delicious *pâté d'alouettes*. At length his bullet found its destined billet: a Prussian shell struck the cage at the window, and death liberated the young lieutenant and his pets as he sat at his piano singing his own last requiem. I was assured of the truth of the story. "*Si non e vero, ben trovato.*"

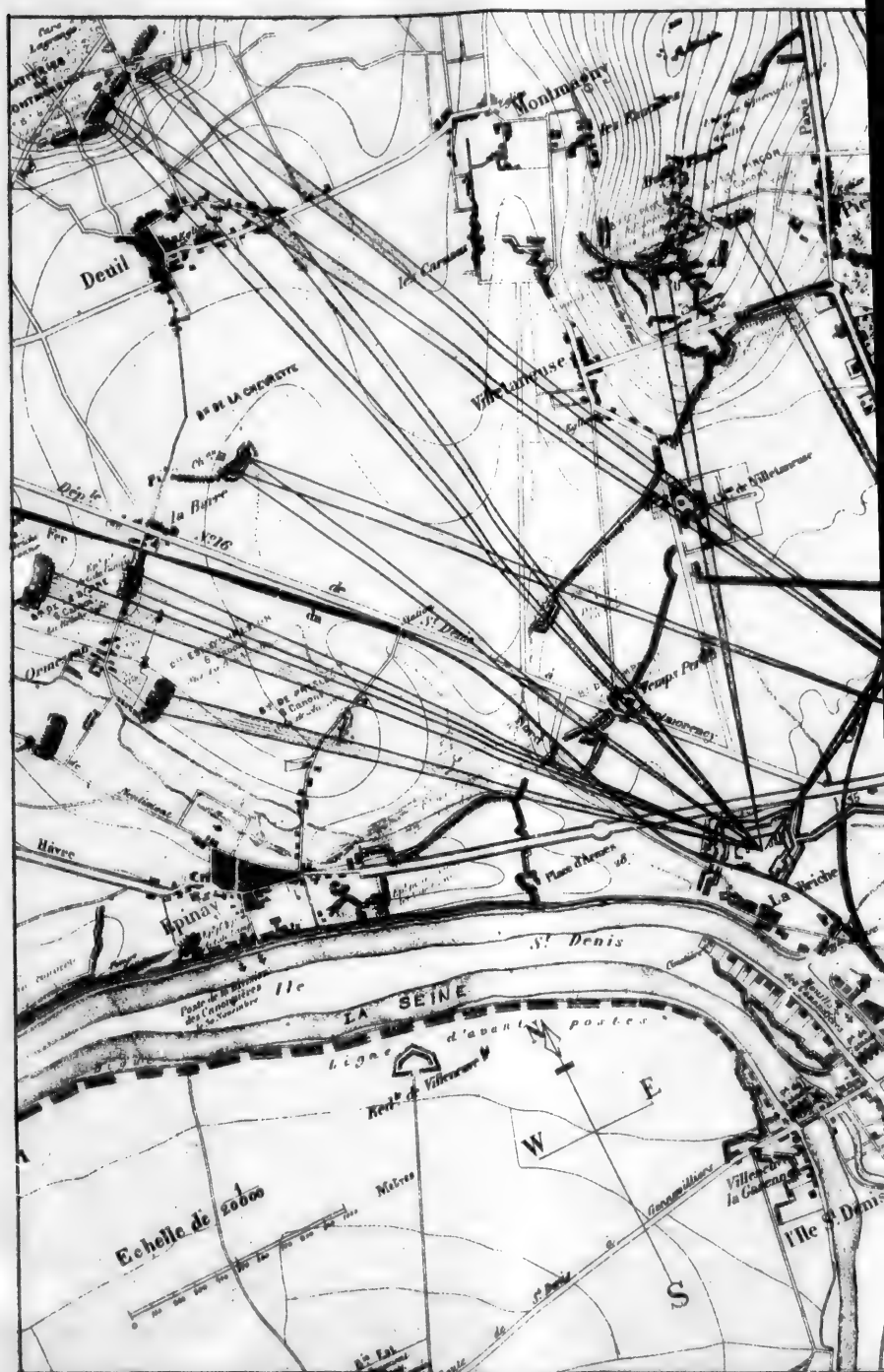
It is typical of the fact that the coarser qualities called forth by war, the sights of suffering and the sense of personal danger, do not necessarily alter a refined nature, which often combines the tenderness of a woman with the highest courage of a man. It is not altogether strange that it should be so, when we remember that the utmost tenderness, the highest personal courage and endurance, were characteristic of the one perfect Man whom we

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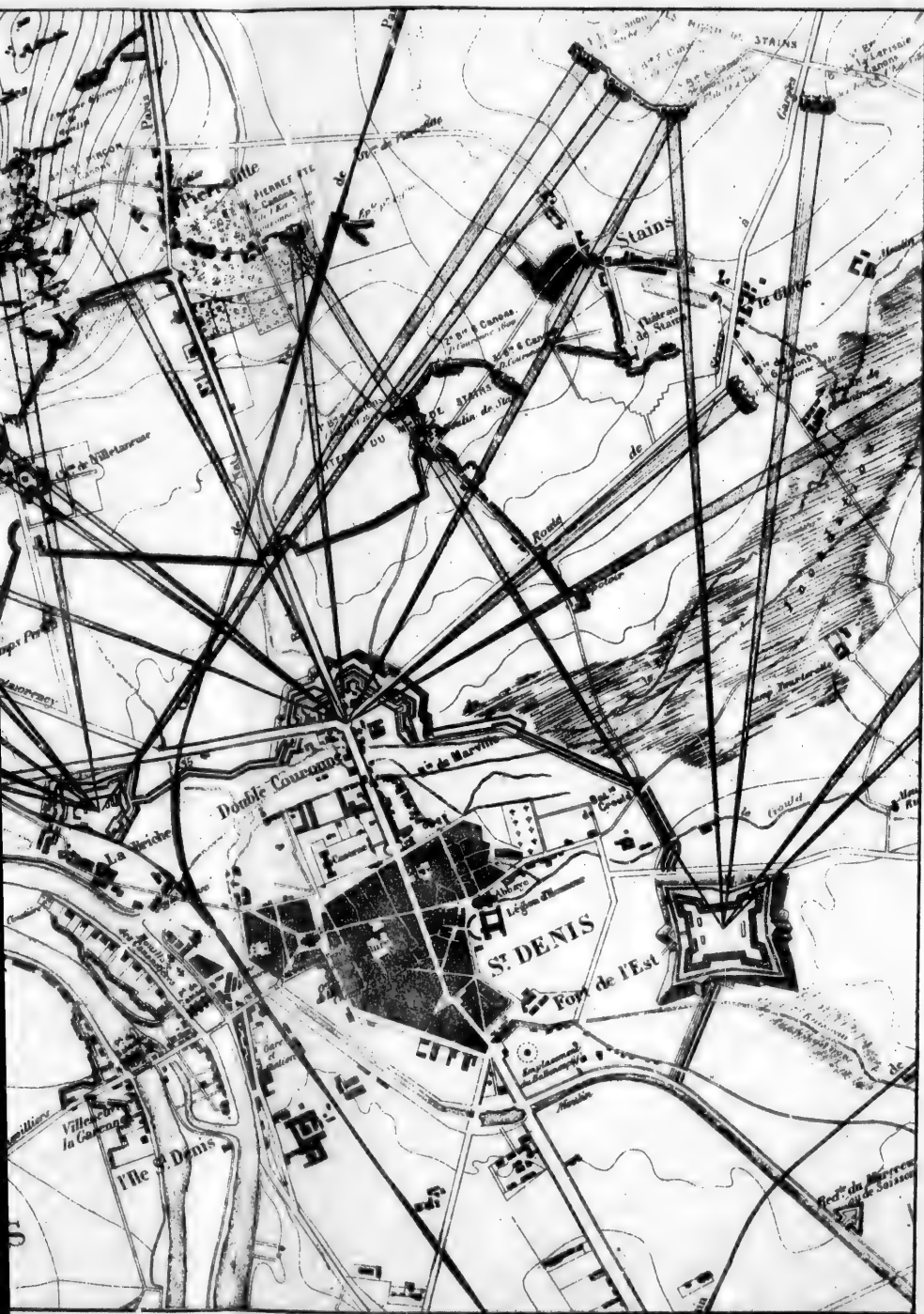
PRUSSIAN SIEGE



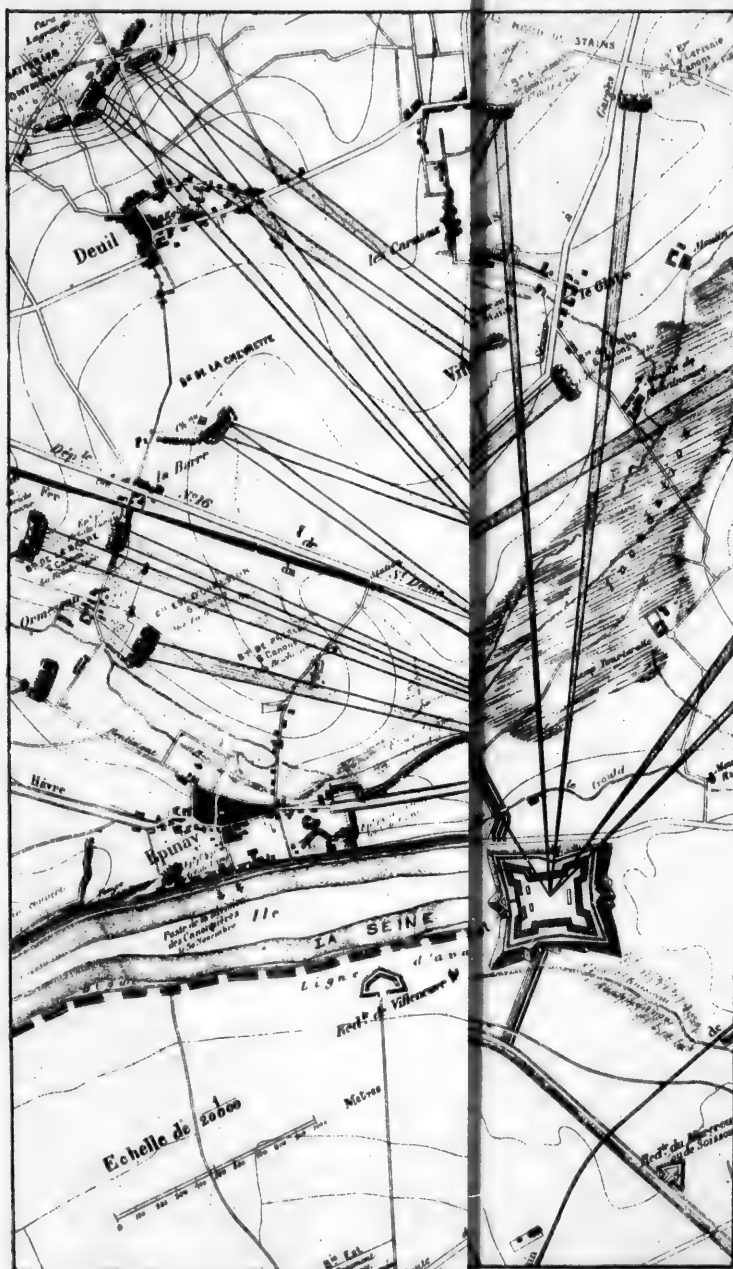
CONVERGENCE OF FIRE FROM SIEGE BATTERIES ON LA BR

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Pl. F



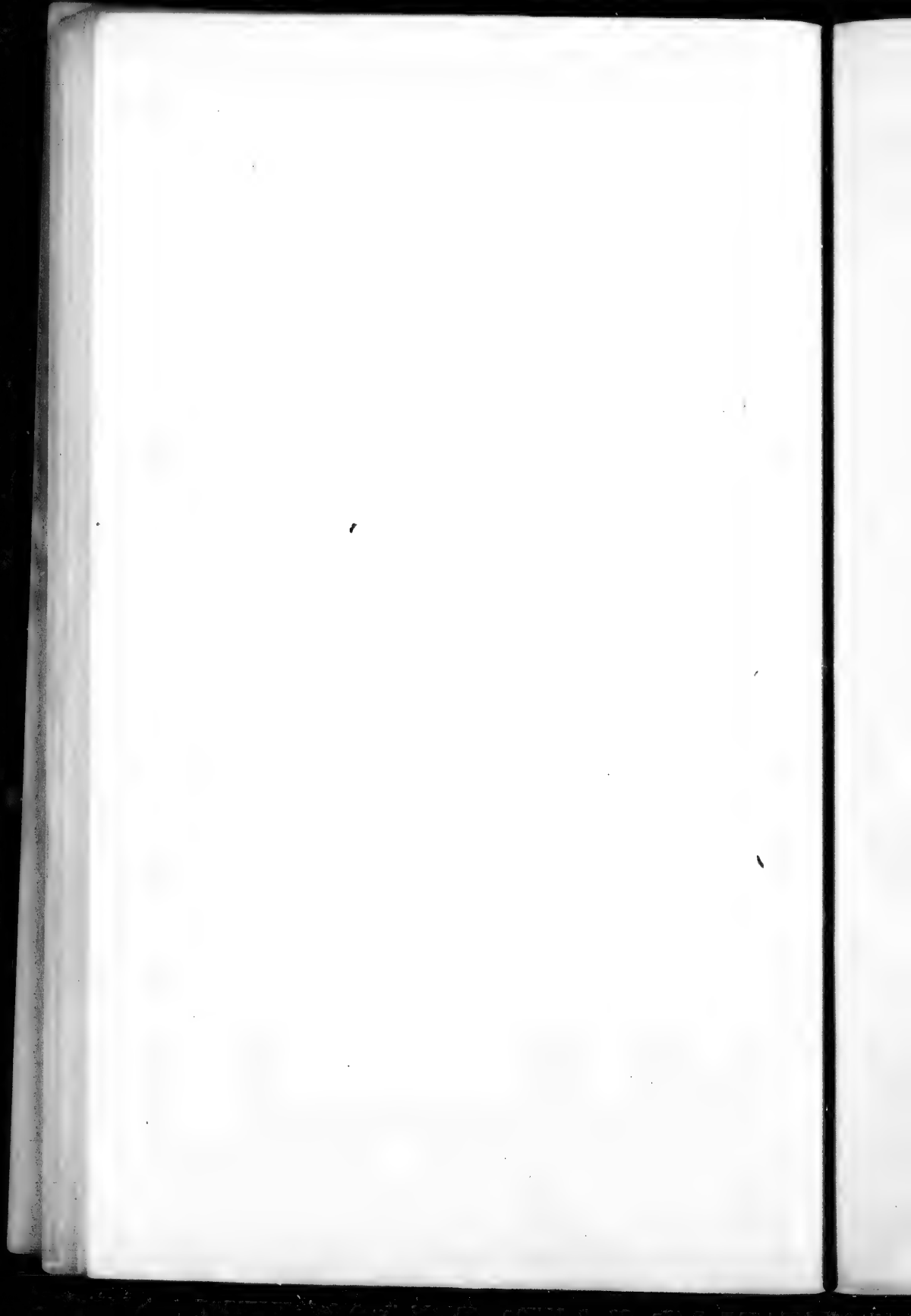
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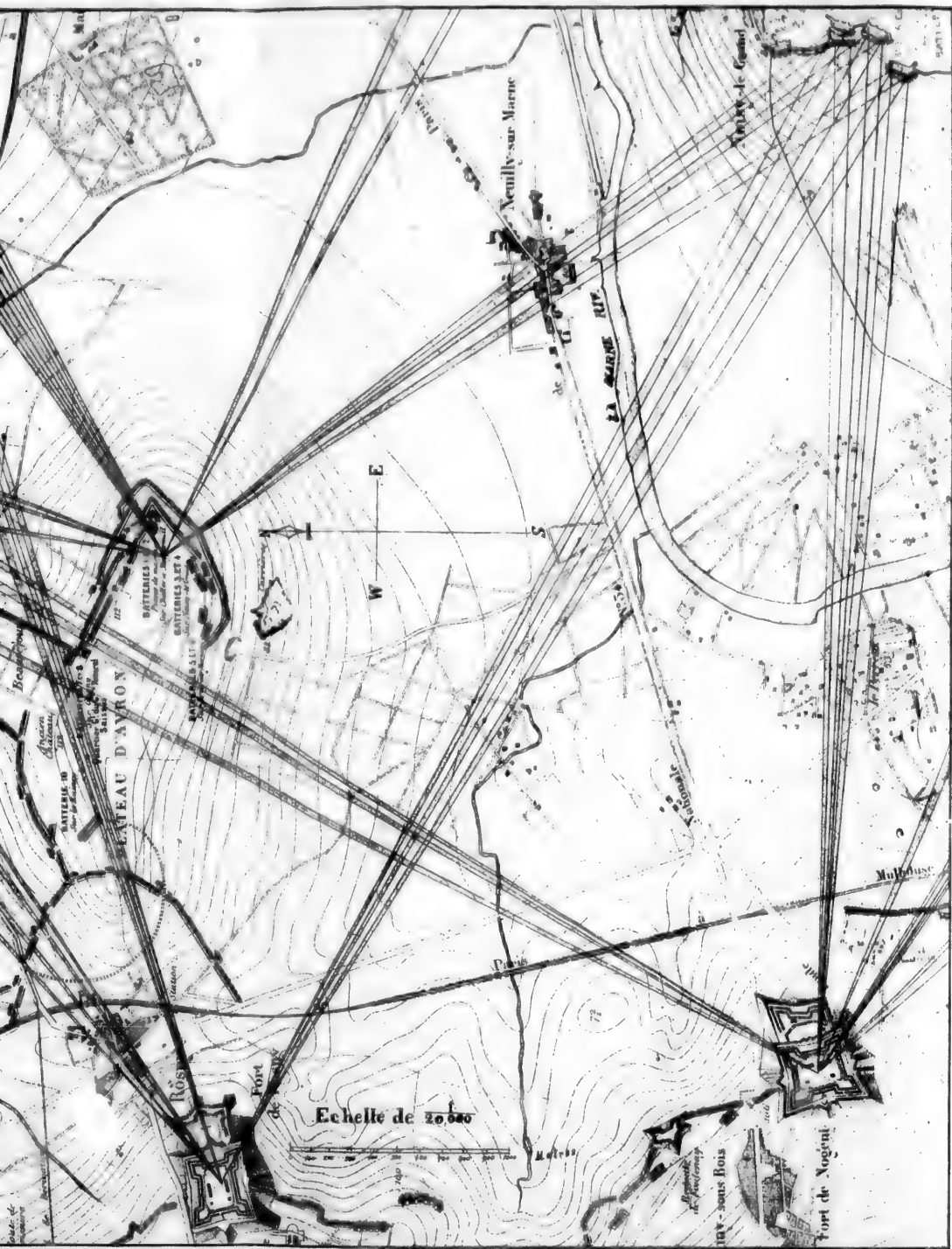
TABLE No. 2.—Bombardment of the Northern Defences of Paris, 1870-71.

POSITION OF BATTERY.	Number of Battery.	No. of Pes.	Rare, Metres.	Command of Battery over Object, in Metres.	OBJECTS.
By Road to Garges, N. W. of Stains.....	XXII.		3200	+ 6	E. Face Double Couronne.
N. of Stains.....	XXIII.		3250	+ 11	Ditto.
Ditto.....	XXIV.	14	2940	+ 16	Ditto.
E. of Pierrefitte near Railway.....	XXV.	3	. 070	+ 14	Ditto.
Heights of Fancelle, E. Slope.....	XXVI.	6	1882	+ 12	N. Face of Ditto.
Ditto, in rear of Quarry, W. Slope.....	XXVII.	8 to 10	2380	+ 32	Ditto.
On the Pavillon Rouge, before Montmorency.....	XXIX.	10	2660	+ 40	Fort La Briche.
Ditto, ditto.....	XXX.	18	4800	+ Considerable	Ditto.
Before Denli.....	1 other.	3	3400	do.	Against Epinay.
South of Railway, near LaBarre.....	XXX.	18	3700	+ Slight.	Ag at N. W. Face Dble. Couronne, or perhaps La Briche.
Before Dugheith.....	others.	6	3000	do.	La Briche.
Before Ornecsen, at level crossing.....	XXXI.	6	3000	do.	Ditto.
Before St. Gratien.....	XXXII.	6	2800	+ 3	Ditto.
Near Epinay, by roadside.....	One.	6	4400	+ 6	Double Couronne.
The Butte Pison.....	2 or 3	24	2500	+ over 50	Ditto.
Between Pierrefitte and Stains.....	Several.	24	270	+ Slight.	Ditto.
Before Stains.....	1 or 2	6			Ditto.



RUSSIAN SIEGE OF PARIS.

Pl. E.



E BATTERIES ON THE PLATEAU D'AVRON, FORTS ROSNY AND NOGENT.



CONVERGENCE OF FIRE AND NOGENT.

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have been for 1800 years more or less feebly trying to imitate, and He took His human nature from his mother only.

To turn to the German bombardment of the north forts of Paris, by about 80 siege and 30 field-guns, which were chiefly directed from three points (see TABLE II.) on the "double Couronne," at ranges from 2,000 to 4,000 metres. Fort La Briche was also attacked by some 60 pieces. The double Couronne did not suffer much; but part of the town of St. Dennis, in rear, was ruined. Mount Valérien, on the west, seemed quite intact; and, indeed, its command was such that very few shells are said to have reached the plateau.

The most interesting feature of the German artillery attack on the east was the plateau of Averon, which had been occupied with French outworks. I was much struck with the German sunken batteries, masked by trees, and enfilading the French salient from the reverse slopes of the opposite hills, in close proximity to the line of rail from Strasbourg bringing up armament and munitions.

The Prussian commandant of artillery (to whom I had a letter of introduction, through the kindness of Colonel Roerdentz, of the Prussian artillery) informed me that those batteries had been armed under cover of the trees, and regulated their fire to a great extent by signals from an officer, who, with a sergeant and a couple of men, ensconced himself in an abandoned French villa in line with their works, keeping the Venetian blinds closed towards the French, and signalling to his comrades from the back windows. Their fire necessarily became most accurate, as they were also guided by very complete plans of the place on which the lines of fire were drawn and the ranges measured. The same distinguished artillery-officer, General

Von Decker, who directed the attack at Strasbourg, most courteously shewed me the plans he had used.

He seemed to attach the greatest importance to such a use of plans for the direction of artillery-fire. I only wish I had found some Departments, with which I have closer relations, as facile on the subject of plans as the commandant of Prussian artillery.

With these few remarks on what I think important points, I must close this outline-sketch of German artillery-attack on Paris. Time and space do not admit of my describing the lines of investment, 50 miles in circumference, or the various sorties and the great battles around Paris in her efforts to break the fiery circle of her foes.

SECOND SIEGE OF PARIS.

The most important batteries are given in TABLE III. ; but, in addition, the old German batteries at "Meudon," "Clamert," and "Chatillon," were rearmed by the French with the smooth-bore bronze converted rifled guns before mentioned, embrasures being, of necessity, cut for the low French carriages and rope mantlets, resembling those used in the Crimea, affording but partial protection to the gunners.

The gaps cut in the *enceinte* for exit by the main roads, during peace, formed the chief points of attack ; and the temporary barricades were almost swept away by artillery-fire. The Porte d'Auteuil and the houses around Point-du-Jour suffered very much, and give some idea of the destruction produced by modern artillery ; yet, from all I could gather, the actual loss of life among the non-combatants was exceedingly small : they remained tolerably secure, if not comfortable, in the cellars of their houses.

Woods, composed of trees large enough to explode percussion-fuse on impact, afford almost complete immunity

TABLE No. 3.—Second Siege of Paris, 1871.

POSITION OF BATTERY	No. of Pieces	NATURE.	Range, in Metres.	No. of Rounds Fired.	Relative Level of Battery and Object, in Metres.	OBJECTS.
Terrace of Valérien.....	16	B. L., Naval.	6160		+ 120	Porte Maillot
Batteries (seven) at Montreuil.....	76	Ditto.	3145		+ 60	Porte d'Antenne and Porte St. Cloud.
Ditto at Bellevue.....	8 to 10	{ M. L. from 22 Rifs. Ditto about 50-Pcs. }	28.0		+ 54	Porte St. Cloud and Pont du Jour, also the Seine.
Batteries in N. Front of Issy to E. of Issy	3	Ditto	2140		+ 72	To form breast-works in front of Pont du Jour and enceinte near Grenelle.
Ditto ditto to W. of Issy	5	Ditto	2140		+ 62	To form breast-works in front of Pont du Jour and enceinte near Grenelle.
Batteries in Bois de Boulogne, most of them in rear of the "Lakes".....	62	{ "Batterie Range" R. M. L. in front of St. P. about 10 Meters }	900		+ 56	To form breast-works in front of Pont du Jour and enceinte near Grenelle.
Part of St. Cloud, at la Lanterne.....	1	Ditto	3100		+ 72	On enceinte towards Point du Jour and Boulogne.
Ditto, at Bellevue.....	1	Ditto	3100		+ 72	On enceinte towards Point du Jour and Boulogne.
Ditto, at Porte du Mail.....	1	Ditto	3100		+ 4	On enceinte towards Point du Jour and Boulogne.

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from fire at such a distance back in the wood as that the view towards the enemy is obstructed by the trunks of trees. In the Bois de Boulogne lived an elderly lady, who had not, she assured me, left her cottage during the whole siege. The trees between the house and the *enceinte* were very much torn and cut about by projectiles; but only one splinter of shell had struck a corner of the house, and done but little damage.

A very rough species of narrow, shallow, double-flying sap, it might be called, which gave many lines of musketry fire, and looked like the trace of a dislocated gridiron, had been pushed from the Bois de Boulogne close to the *enceinte*, after the parapets were comparatively cleared of defenders by curved shrapnel-fire and musketry.

SIEGE OF STRASBOURG.

This siege was, perhaps, the most regular of any during the war (plate 2, fig. 5). The bombardment of the town, which began on the 24th of August, having failed to produce surrender, the first parallel was traced at about 800 yards from the *enceinte*, and completed by the 28th. Batteries for 46 guns were finished by the end of the month; the second parallel was finished at the end of the first week in September, and the third parallel begun on the 12th. The close attack was almost entirely carried on by flying sap. Wall-pieces, with picked marksmen and light field-guns, were pushed forward in the trenches, and very much facilitated the approaches. About 240 siege-guns were placed in position. TABLE IV. gives details shewing a total of 193,000 rounds fired in a month—an average of 6,000 rounds per diem.

Two practicable breaches were made: that on the right face of Lunette No. 53 took four days and about 1,000

rounds; that on the right face of bastion No. 11, only eighteen hours and 600 rounds (plate 2, figure 5).

These results were produced by curved fire from rifled guns, of which I will endeavour here to give a brief description.

In these days of long-range small-arm breech-loaders, breaching-batteries, as I before explained, have to be opened at considerable distances, and often in such positions that they may be built and armed without observation: the gunners, therefore, labor under the disadvantage of not being able to see the object of fire. The masonry of a fortress being covered by the glacis, the shell must be made to lob over the crest of the glacis or projecting counter-guard, and strike the escarp-wall sufficiently low down for the debris to form a practicable breach (figures 6, 7 and 8, plate 3). This means a curved trajectory, or a considerable angle of descent, necessitating high elevation and low final velocity, combined, of necessity, with diminished penetration and accuracy, demanding considerably more skill from the gunners than the old method of direct fire at short range.

For curved fire, the distance of the batteries from the work being known from the map or calculated by range-finder, the required angle of descent must be ascertained by construction from profiles of the fortress, and the amount of the charge that will give such angle found from tables or calculated. Some visible part of the work directly above or near the spot of the required breach is selected, and fired at with a given number of rounds, to find the point of mean impact, which is then transferred to the spot intended to breach, calculating the decrease of elevation and the amount of deflexion to the right or left. A horizontal cut is first made in the masonry, about one-third ($\frac{1}{3}$) the height of the wall from the bottom (plate 3, figs. 6 and 7).

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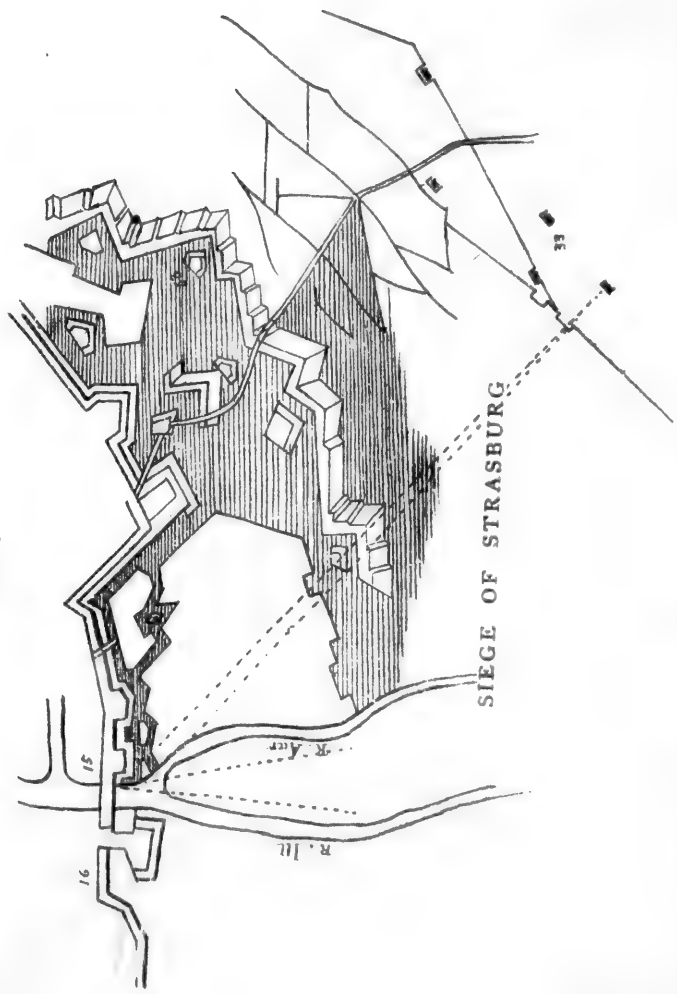
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TABLE No. 4.—SIEGE OF STRASBOURG.

Against Citadel.	Against Town.	NATURE.	No. of Rounds said to have been Fired.
16	30	Long B. L. R. 24-Prs.....	28,000 Shells (5,000 of them Shrapnel Shells).
.....	12	Short B. L. R. 24-Prs.....	45,000 do. do. do.
16	64	B. L. R. 12-Prs.....	11,000 Shrapnel.
.....	20	Ditto 6-Prs.....	8,000 Shells and 4,000 Shrapnel.
.....	2	Rifled Mortars of 8.3-in.....	600 Shells.
.....	19	Mortars, 50-Prs.....	15,000 ditto.
4	20	Mortars, 25-Prs.....	20,000 ditto.
.....	30	Hand ditto, 7-Prs.....	23,000 ditto.
8		Mortars, 60-Prs.....	3,000 ditto.

FIG. 5



SIEGE OF STRASBURG

FIG. 8

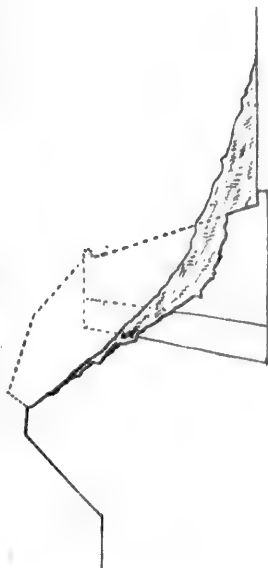


FIG. 7

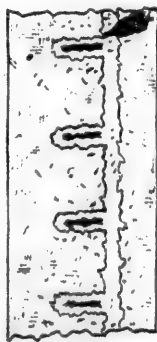
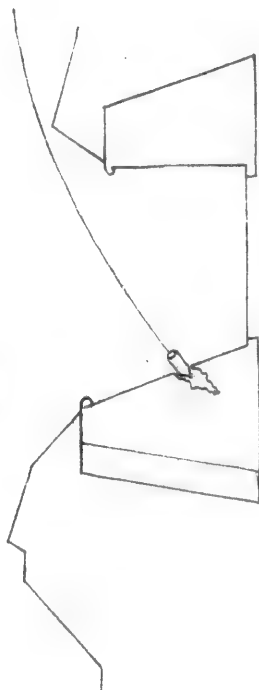


FIG. 6



BREACHING BY CURVED FIRE

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When this cut is supposed to be effected by a series of shots, vertical cuts upwards are then made from the extremities of the horizontal one, at intermediate cuts made until the wall comes down (plate 3, figures 7 and 8); but this extreme theoretical accuracy is not obtained in practice, especially when the completion of the first horizontal cut can only be conjectured from certain phenomena, viz. :

(1st.) The concussion and explosion of a shell has a hard, sharp sound, if it hits solid masonry; on the other hand, it has a hollow and faint sound if it hits masonry either wholly or part broken through—in this latter case, the shell exploding in the earth behind the wall.

(2nd.) Fragments of stone are hurled into the air as long as the masonry resists.

(3rd.) The smoke from the explosion of the projectile soon rises above the wall, is of a bluish tinge, and forms a "ball" if the masonry remains intact. If the masonry has been broken through, the smoke appears after some delay, is of a darkish grey colour, and rises slowly, as if coming from a chimney-pot.

The determination of the range, Lunette No. 53, took a long time, as the range-party in a trench between the second (2nd) and third (3rd) parallels could see the glacis, but not the wall to be breached; and as there was no telegraphic communication, the report of each shot had to be sent by a chain of posts along the trenches to the batteries (plate 2, fig. 5).

The elevation varied on different days, on account of heavy rains and meteorological causes, when the horizontal cut was half-completed. A system of counter-mines in front of the Lunette was penetrated from the third (3rd) parallel



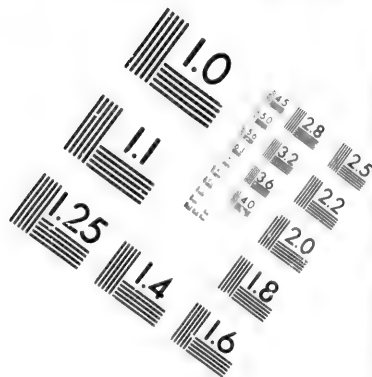
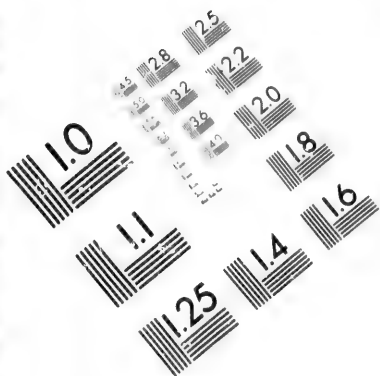
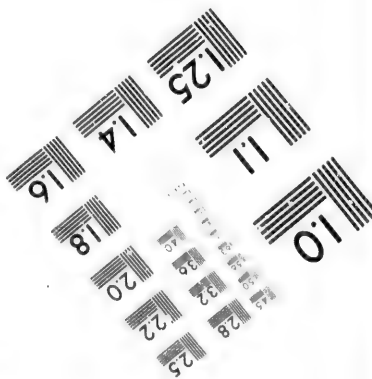
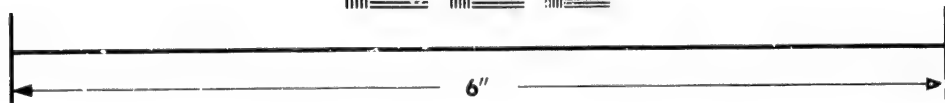
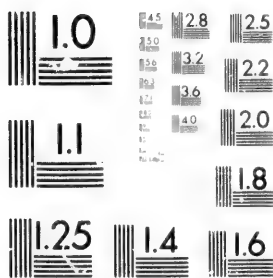


IMAGE EVALUATION TEST TARGET (MT-3)



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through a gallery driven by the German engineers. From the opening of this gallery in the counter-scarp the effect of fire could be accurately obtained and reported to the batteries. The horizontal cut was found far from perfect: many shells, striking above the intended line, gradually shook the whole wall; while the lower part was cut through, until great masses came down, followed by earth, so that it was not found necessary to make vertical cuts. A great number of the shells, with large bursting-charges, were finally fired into the earth of the parapet to bring it down.

The breach had a slope of 35° . It was not defended, though there was a wet ditch at its foot.

There is a very interesting description of the passage of the ditch in front of Lunette No. 52 given in the Royal Engineer Papers, by Colonel Lennox, Royal Engineers; and in the Royal Artillery Institution Papers, a translation by Captain F. C. H. Clarke, Royal Artillery, from General Von Decker's Report, containing a description of the above operations, together with the partial destruction by curved fire of the unseen sluices which retained the waters of the ditch and inundation, which added to the difficulties of the siege of Strasbourg.*

It would be interesting, if time permitted, to go into the reasons why no breach was defended in the late war by the troops of a nation celebrated for the obstinate, bloody, and often successful defence of breaches assaulted by as dogged an enemy as any known to history, namely, the British infantry.

* NOTE.—My acknowledgments are also due to the professional papers of Colonel Smyth, R.A., and Captain Parnell and Lieut. Frazer, R.E.; of Col. Denfort Rocherau, Corps du Génie; as well as to German official accounts, &c., translated by the War-Office.

The change in weapons, especially the introduction of *mitrailleuses*, since the Peninsular war, was thought by many to be favorable to the defence of a breach by resolute soldiers.

SIEGE OF BELFORT.

The garrison of Belfort consisted almost entirely of Mobiles: only a very small proportion were troops of the line; among these, the 43rd regiment distinguished itself, as it did also at the subsequent siege of Paris.

To make the preliminary preparations of defence, there was only a half-battery of regular artillery and 4,500 Mobiles, without instruction or sufficient instructors,—there being only three officers of the *Corps du Génie* and two civil engineers acting as auxiliary. To these, four battalions of Mobiles, *en blouse*, badly armed and totally uninstructed, were subsequently added; and some 5000 *Franc-tireurs*, commanded by an energetic captain of artillery, held outposts.

The attacking force was supported by the army of General Von Werder, but threatened by Bourbaki. Bombardment was first attempted, with but so little success that a regular attack was commenced.

The north side was the most favorable for the operation; but, as the citadel on a hill dominated the country to that side, a second special siege of the citadel would have to be undertaken after the capture of the town and outworks.

On the south, the twin-hills of *les Perches* rose to a height about equal to the citadel-hill, and about twelve hundred metres from it: they were occupied by temporary field-works (redoubts), with a garrison of four hundred men each (plate 7, fig. 13). Before commencing the attack

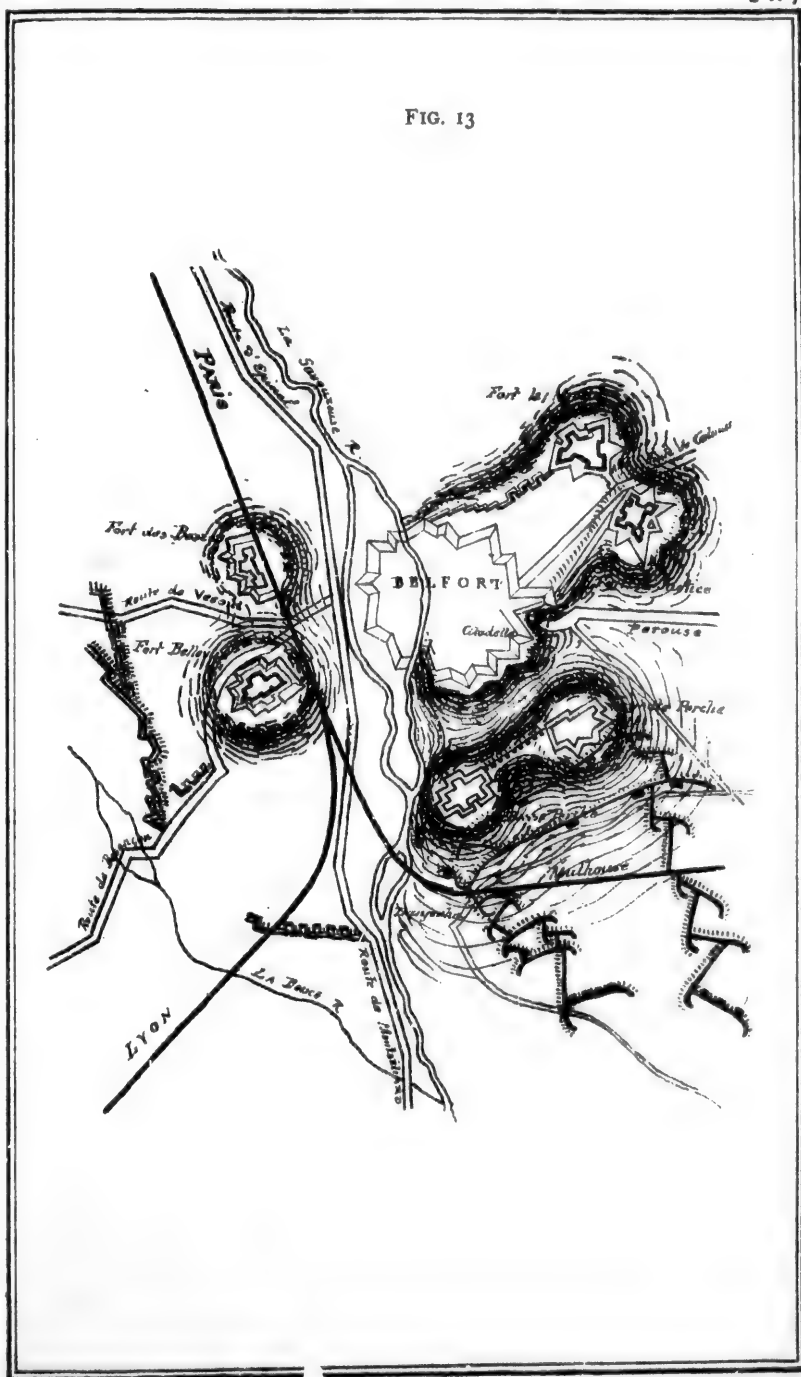
on these redoubts, it was necessary to capture the villages of Daujoutin and Perouse. The former was taken by a night surprise. Two German companies passing along the railway-embankment unperceived, the French Moblots guarding this point having been left by their officers, who were passing the evening in a tavern, their men, it can easily be understood, were not over-vigilant, and took a panic, which was rapidly communicated to their comrades.

The appendix to the journal of the siege by the commandant of the place, Colonel Denfort Rocherau (a brave and reliable French officer of the *Corps du Génie*), contains a mass of mutual recriminations by the officers so disgracefully negligent, who make all sorts of accusations against the commander of the post, which are only another proof of the worthlessness and want of discipline of these irregulars. An officer of the Royal Engineers, who was present during the siege, speaks of the pitiable spectacle presented by the panic-stricken mob in the garb (but without the feelings) of soldiers.

It must be remembered that a large proportion of the German attacking-force were not regulars, but Landwehr-men; but the Prussian militia (every man of which has served three years in the regular army, or one year as a volunteer of superior education, who has passed a military examination) is a very different force from the hasty levies of the French Republic, fed for the most part on bombast, clothed in shoddy, served out, in too many instances, with brown paper shoes, and commanded by eloquent *avocats*.

The German batteries against *les Perches* redoubts were screened by the woods of Bosmont. The first parallel was opened at 1,000 yards. The first assault, which advanced on a moonlight night over a light fall of snow, was repulsed,

FIG. 13



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Many Germans were taken prisoners in the ditch of the redoubt, the escarp of which they were not prepared to escalate, and could not climb. Regular approaches were then commenced, and flying sap used for the close attack (plate 7, figure 13).

When the works approached the redoubts they were abandoned by the garrison. A line of German batteries was then constructed along the ridge, about 1,000 metres from the chateau, at about the same level. The labor of bringing up the guns was enormous, as many as 100 men being required to drag each gun up the steep slope. The fire of the batteries on the ridge soon silenced that of the place. The guns on the open parapets below had suffered considerably. The Haxo casemates at the top of the citadel remained fairly serviceable, when the place capitulated. I have been told by the officer of Royal Engineers before quoted, who was with the German army, that the German commander had actually determined to abandon the siege, and that some of the investing force had actually been ordered to withdraw, when the place surrendered to a staff-officer sent to demand terms which he knew his commander was not in a position to enforce; but it is difficult for an outsider to be certain of the intentions of a general.

THIONVILLE.

The capture of Thionville may be regarded as typical of that of the minor French fortresses, similar causes producing similar results.

It is a small fortified town, of about 5,000 inhabitants, in a basin about two miles in diameter. It commands the Moselle, several roads, and two lines of railway. It is just one of those cases where geological formation gives birth to a city, necessity for its fortification, incentive to its sieges, and, finally (with a change in weapons), the means for its

capture by establishing batteries on the surrounding hills commanding the fortifications, and affording every facility for enfilading the long faces of the Vauban trace. It was, in the first instance, invested by a handful of troopers (600) and a dozen or so of the engineer corps, who multiplied themselves by using a four-horsed coach to carry them from one threatened point to another, hastily fortifying various farm-houses.* By these means (what the Yankees would call a "bogus force") they imprisoned a garrison of 1,000 regular infantry and several thousands of Garde Mobiles, who the commandant declared to be unformed and unreliable to break the investment, which was maintained until the arrival of the investing force of 12,000 men, with 75 siege-guns, only 50 of which and 30 field-guns were put in position, firing principally on the barracks and arsenals, none of which were bombproof.

They opened a steady fire at a rate of one round every quarter of an hour, day and night. The shells, with percussion-fuses, descending from the heights, and concentrated on the town, told with effect on the buildings, but with little loss of life to the besieged, viz., eight killed and 66 wounded, two only of these being civilians.

I was much surprised to hear the loss was so small, on walking through the damaged streets of the town a short time after its capture, in company with a brother-officer. We had been refused access to the parapets by the brusque Teuton sentries. This was aggravating, as we had only a few hours to spare. Happy thought!—the high steeple-tower of a central church was conveniently loopholed with shell-bursts. We made for it, but here again were refused access, in spite of a silver key. The church was undergoing repairs; the custodian turned his back for an instant to superintend the

* Lieutenant-Colonel Smyth, R. A., Royal Artillery Institution Papers.

workmen; we bolted up the stairs, and ensconced ourselves among the rafters of the belfry, from whence the shell-holes in the roof gave us a complete bird's-eye view of the fortifications and the position of every German battery. We had sold the watchful Teuton.

We were, however, startled on our perch by the tremendous vibrations of the huge bell, just above us, which warned us we had barely time to catch the train for Metz. Descending, we found ourselves, to our disgust, locked in, and the workmen gone. As a last hope, looking through the key-hole, we saw our obdurate friend locking the outer gate, and called to him. He opened the Sesame with violent abuse of our perfidy, declaring us "not true men, but spies," who would bring ruin upon him and his innocent family. He refused all douceur, begging us, in frightened accents, with many a look over his shoulder, to be gone and tell no one, "*pour l'amour de Dieu.*"

SEDAN.

In the old fortress of Sedan, situated in an almost exactly similar basin of hills to those around Thionville (plate 4, fig. 10), crowned by the German field-artillery, whose shells flashed upon the pavements and through the roofs of the old town at their feet, the chivalry of France laid down their arms, after gallant but fruitless efforts to break the circle of fire and steel that surrounded them.

METZ.

A court-martial has declared that the surrender of Metz and the splendid army under its walls was due to the political treachery of its chief, who basely falsified the proud boast of brave men, that "*La Garde meurt, mais ne se rend pas.*"

Without going into the details of the minor sieges, I will, if your patience permits, recapitulate what I think to be the *leading points of difference in the attack and defence, consequent upon the introduction of rifled guns and breach-loading small arms* :

1st. It is *no longer necessary*, nor desirable, to *carry on regular attack* until breaching-batteries are established on the escarp.

2nd. The long range of rifled guns has given a wide scope for the selection of *the sites of batteries, generally on the reverse slopes of distant hills, behind woods, &c., and in close proximity to railroads or good roads, facilitating armament and supply of ammunition.*

3rd. Breaching by curved fire, or *distant but concentrated bombardment, requires greater skill on the part of the gunners, and, consequently, higher training.*

4th. Embrasures, except in a few peculiar positions, being found to be shot-funnels for directing an enemy's fire to your own destruction, *a barbette system becomes a necessity.*

5th. *A system of range-finders, combined with accurate plans, on which the lines of fire can be laid down, as well as a system of telegraphing results of fire from a good point of observation, are also necessary.*

6th. *Complete tables of range and elevation for curved fire, with any given angle of descent deduced from the combined results of theory and practice, are a great want.*

7th. *The general introduction of rifled mortars, firing also vertical shrapnel, with a fixed charge and varying elevation.**

* NOTE.—Proposed by Captain Orde Browne, Royal Artillery.

8th. *The concentration of fire from dispersed batteries, admitting a large supplement of field artillery: the whole under the unfettered direction of an artillery chief.*

9th. *The complete investment in a very wide circle is a necessity which is practicable in the case of an inland fortress, besieged by an overwhelming force, but not in the case of a maritime fortress, unless the besiegers are masters on both land and sea.*

10th. *The cruel bombardment of a comparatively defenceless city in preference to attack, restricted to the fortifications, calls to mind the recommendation given in the book written for all time, as to the advisability of non-combatants leaving Jerusalem before the siege.*

DEFENCE.

These considerations lead us to the first principle of modern defence :

1st. *The necessity of keeping a besieger at arm's-length by superior artillery, so disposed and protected as to retain its power to the last. To my mind this seems practicable principally by a system of detached Moncrieff gun-pits, supporting each other and connected by troops in the field, who should cover themselves by temporary entrenchment, being physically and morally supported, fed, and relieved from the fortified city of which they formed the first line of defence.*

2nd. *The accumulation of munitions de guerre and munitions de bouche in fortified places of strategical importance, and the abandonment of the defence of such places as are not of vital importance.*

3rd. *An effective permanent garrison of trained artillery, familiar with the locale, the armament, and the stores on*

which they have to depend. They should be largely supplemented by an auxiliary volunteer citizen-artillery and infantry under discipline.

4th. *The advantages of such commanding positions as Gibraltar and Quebec, especially where the sea renders complete investment difficult against a maritime power.*

5th. *The great importance of bombproof cover, expense magazines, traverses, ample means of repairing material, and extemporizing cover.*

I would now consider how the above principles apply to the ancient fortress in which we live.

As artillery is obviously the most effective element of modern defence, its application should be developed to the utmost, and fortifications made subservient to it,—defence consisting, “*not of an armed system of fortification, but of a fortified system of artillery.*”

A besieger must be kept at arm's-length, which can only be done by superior artillery, so disposed and protected as to retain its power against attack, if not indefinitely, until such time as relief is at hand. As long as “*Britannia rules the waves,*” such a period would not, I trust, be indefinitely prolonged. Inland continental fortresses differ *materially* from the maritime strongholds of Great Britain. I can recall no instance in our history, since the loss of Calais, where the old flag has been lowered at the bidding of a besieger for want of succour from the sea, our great base of operations. Especially does it hold good in the case of a maritime fortress such as Quebec, where “*Field-Marshal Frost*” prevents the possibility of a longer investment than five summer months; and even in summer, the mighty sweep of the St. Lawrence would render complete investment almost an impossibility to an invader, who could not transport very heavy guns and their enormous weight of ammunition for a long distance over difficult country, with

few and bad roads, impassable in the spring and fall.* The defender, holding the river within the circle of forts, could throw his *whole force on a section* of the enemy divided by the St. Lawrence and separated by it from their base of operation and line of retreat. The complete railway systems at the command of Prussia did not enable her to bring heavier guns than 60-pounders in her siege-train. There are certain physical data which do not alter, viz., the strength of men and horses; the badness of country-roads; and railroads, from the numerous other calls upon them in war, have been found incapable of transporting very heavy artillery. It is hardly to be supposed that the mistress of the seas and her eldest daughter, Canada, who already ranks third among the commercial navies of the world, would permit the siege-train destined for the attack of Quebec to be conveyed by sea. The armament, therefore, of Quebec might easily be superior to that brought against it, even by hostile iron-clads, whose unarmoured decks would be exposed to the Citadel fire, which, with the addition of a few torpedoes, would secure the St. Lawrence, if those upon whom the responsibility devolves considered the subject of sufficient importance to warrant a comparatively trifling expenditure.

It is not for me to comment on the acts of legislators holding the reins of Imperial or Dominion Governments; but the past legislation of defunct governments has gone into the region of history, and may be discussed. As a mere soldier,

* NOTE.—The coming winter will be the centenary of the expedition of Generals Montgomery and Arnold against Quebec. The former, with incredible hardships, came through the State of Maine, but returned not with his life; and the latter withdrew the shattered remnant of their force. Better had it been for his honor that he had shared Montgomery's fate ere he soiled his name by treason to his self-elected allegiance. The new forts at Levis completely command the intersection of roads and railways east, west, and south, as well as the valley of the Chaudière and Kennebec road, by which the ill-fated Montgomery marched, and occupy the ground from which Wolfe shelled the town.

I was struck with amazement at what you probably did not notice, viz., the repeal, last year, with the concurrence of both the Imperial and Dominion Governments, of an Act of Confederation entitled the "Canada Defence Act," which provided for the transfer of the guaranteed loan of £1,000,000 for the defence of Montreal (the titterly defenceless commercial capital of Canada) to that political maelstrom, the Pacific Railway. At the same time, the Canadian Government declined the *free gift* of a new armament for the Quebec and Levis forts, provided for by the Canada Defence Act. The wisdom of declining to examine the dental development of an equine gift is proverbial; but the refusal of such a gift as the above was never dreamt of in my poor proverbial philosophy, nor in that of Mr. Martin Tupper, as far as I remember.

I have not yet been able to discover the epoch when Quebec ceased to be the key to navigation, by which British succour can come to Canada, or a hostile fleet of gunboats enter its inland waters, unless Reciprocity compels us to enlarge the Caughnawaga Canal, &c. In any case, unpleasant as the truth may appear to the valiant and self-reliant yeomanry of Ontario, Quebec would remain the only one possible stronghold upon which our militia, rolled up by an invading force from the west, could retreat, and wait for that help which never could be denied from the mother-land.*

* NOTE.—Successful initiative in war is everything. Both nations are forbidden by treaty to build gunboats on the lakes; but gunboats can and have, with the first note of war, passed up the St. Lawrence by the Lachine Canal, and on to the lakes. The Beauharnois Canal, on the South Shore (that monument to dead patriotism), would be rendered useless at the commencement of hostilities by the United States. But the necessities of commerce, with us stronger than any consideration of national defence, point to the probable enlargement of the old Canal on the North Shore, from the Cedar Rapids to Coteau Landing. The defenceless emporiums of commerce on the lakes would then be at the mercy of those who held Quebec.

Halifax is an open harbour, and useful as a coaling-station for the West-Indian fleet; but the treaty which handed over our compatriots of the State of Maine sends a wedge of territory up to within a few miles of the Intercolonial Railroad, which a handful of troopers could at any moment render unserviceable in a night, cutting off retreat to Halifax or succour from thence to the upper Provinces. 'Tis true that small detachments were sent from Halifax during the *Trent* difficulty, but the United States had "other fish to fry."

Assuming, then, a certain sum of money to be granted by the State for purposes of defence,—and *a very large sum, in the shape of rents of Imperial property, has been granted, though not, I believe, applied to that purpose*,—the maximum reasonable proportion of it should, I think, be appropriated to the application of protected artillery in the five important strategical points, viz., St. John, N.B., Quebec, Montreal, Kingston, and Esquimalt (the proposed terminus of the Pacific Railway in British Columbia).*

I am not singular in supposing that detached gun-pits on Major Moncrieff's system are the best means of meeting modern attack on an effective and sufficiently economical principle. With great admiration for the sister-service of the Royal Engineers, I cannot divest myself of the idea that they inherit not only the talent but the fancy for building in *Louis d'ors*, attributed to the French engineers by Louis Quatorze.

* NOTE.—For Ontario, trusting in the loyal strength of her militia, to be indifferent to the defence of Lower Canada, and especially of Montreal, resembles a warrior with a good helmet being indifferent about a cuirass for his stomach as long as his head was protected; or the much-maligned ostrich, who, on the approach of an enemy, stuck his beak in the sand and left his posterior exposed, believing it invisible. As for Montreal, it is said that modern Danæ is only too eager to embrace the trans-Atlantic bird of Jove, believing, as of old, that he will come in a shower of gold, which, however, may take the disagreeable form of *inflation*.

Laying aside costly iron shields, granite structures, and the ingenious devices for doing away with the destructive effects of recoil, Moncrieff simply trusts to the broad bosom of mother-earth, digs a hole for his gun, and chains the destructive giant of recoil an obedient slave to his gun-wheels.

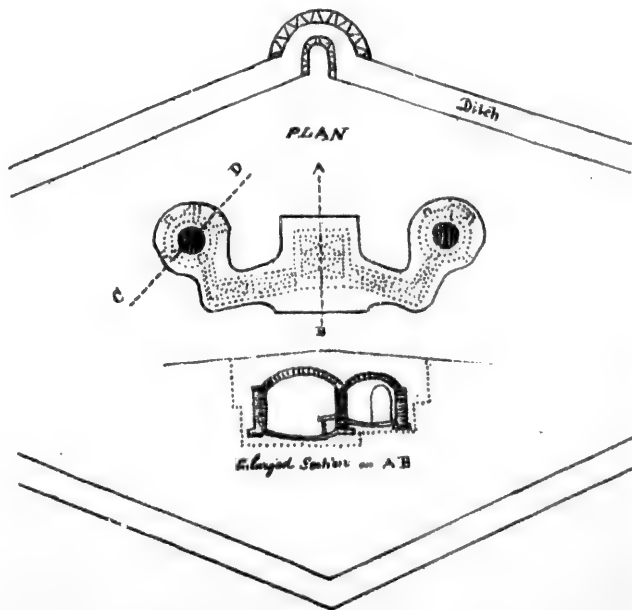
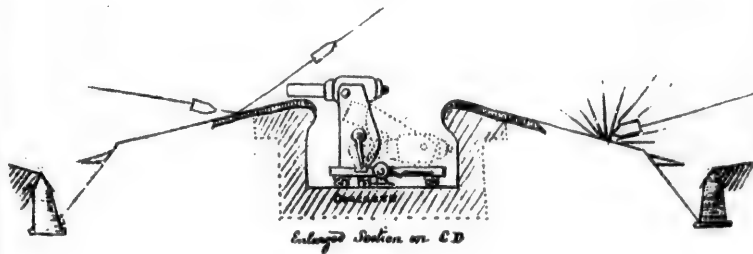
Time does not permit me to explain the system. I trust plate 6, fig. 12, and the models, will render it intelligible to those who are not already familiar with it. As to its advantages, they are self-evident,—protection from direct fire while it gives an all-round fire, thus enormously increasing the value of a single gun, and its inexpensiveness, compared to the bastioned or polygonal trace, with ravelins, caponiers, &c.

Its only vulnerable point is liability to vertical fire; but you who are riflemen may judge for yourselves of the comparative value of such an objection by considering the difference between hitting a visible upright target and dropping a shot upon the same target when laid flat on the ground. Besides, we must remember the saying of the first Napoleon: "*On ne peut faire d'omelettes sans casser des œufs.*" From no system of fortification can we expect entire immunity from danger in war. The actual expenses of the pits would be comparatively little. The principal outlay lies in the Moncrieff gun-carriage; but as (by the Act so lately repealed) the British Government offered to arm the forts the Dominion Government would build, I thought the keen commercial intellect of Canada might have realized and adhered to the wise arrangement which left the principal burden on the richer mother-country.

It is not, however, to be supposed, in speaking of detached works in such positions as recommended by Colonel Jervois, Royal Engineers (as shewn in plate 8, fig. 14), with the view of keeping an enemy at a distance, that all the comparatively old fortifications are useless, from some inherent vice of construction; quite the contrary. The fall of the French

MONCRIEF SYSTEM OF MOUNTING HEAVY ORDNANCE

FIG. 12



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fortresses is attributable to many causes which may seem far-fetched to you,—for instance, the geological formation of the Paris basin, which repeats itself at Sedan, Thionville, and elsewhere. These valleys caused confluence of rivers, as before remarked, the convergence of roads, and the growth of towns, to be in the future fortified by Vauban. The diameter of these basins was so large as to render the surrounding hills unavailable for the old artillery attack; not so for modern guns, whose fire commanded and could converge upon the helpless town.

No such reasoning can be applied to the fortifications of Quebec, which, however, painfully remind me, in their dilapidation, their obsolete armament, and their scanty artillery garrison, of the state of some of the French fortresses at the commencement of the late war, when it was too late, as regards preparation, to obviate the apathy of peace, strangely co-existent with the delusive cry, "*à Berlin!*"

For the comparatively small sum of about \$40,000 (£8,000) an effective armament of rifled guns, as heavy as any that were brought against Paris, could be supplied to Quebec by selling some of the obsolete ones, getting the converted $\frac{64}{32}$ Palliser rifled gun, *for which the old carriages and stores would serve.** Any other system would necessitate the

* NOTE.—The same reasoning applies to the armaments at Kingston, Montreal, Toronto, and elsewhere, as I have pointed out in official Reports; and no very heavy armament is required at present in Quebec, as there are no cis-Atlantic iron-clads capable of resisting a 7-inch M. L. R. projectile, nor even a 64-pounder, which, if fired from the Citadel command, would penetrate the light-armoured deck and knock a hole through the unarmoured bottom, unless it was thought preferable to burst the shell between decks. Though Dominion Inspector of Artillery, my visits have been officially restricted to the Province of Quebec. I must, therefore, be pardoned if my views have unconsciously taken too local a coloring. I have not, however, lost sight of the fact that the unprecedented development of Ontario and the self-reliant character of its people have modified the conditions set forth in the Report of Colonel Jervois, R. E., submitted ten years ago.

purchase of new carriages and other material, which would cost probably ten-times the above sum. The Government of India and that of Melbourne in Australia have purchased an armament of converted Palliser guns at comparatively small cost, such as I recommended two years ago for Quebec. I see they have been largely used at the miserable siege of Carthagena, in Spain, from which, however, we can learn little but the miseries entailed by the weak government of the clamorous many.

In its present unarmed state, a roving *Alabama* might run into such a position at Quebec as would enable her, under threat of bombardment, to demand from his honor the Mayor and gentlemen of the Corporation a sum that would far exceed anything they are likely to realize by the transfer of the late Imperial ordnance property from the purpose for which it was given. It is not desirable that I should point out our vulnerable points; suffice it to say that the lower lines, regarded by many as picturesque ruins, are of more importance than are dreamt of in your philosophy.

CONCLUSION.

"*Cui bono*" these pages? Official reports have one of two fates—to be pigeon-holed, perhaps deservedly, or printed in a blue-book, which is but little read and never acted upon; its main result being to produce in England the remarkable hallucination that Canada has an efficient army of 600,000 men. There has been a profusion of pamphlets and articles on militia matters, mostly by militia officers, shewing deep dissatisfaction with their present state, on the part of the militia itself. In the multitude of counsellors we have been waiting for wisdom; but perhaps the "prophets prophesy falsely," because "the people love to have it so." No one has had pluck to probe the wound. The militia law, like other laws, depends for its effect upon its administration.

With some modifications it would not be a bad law ; but it did not anticipate the removal of the British troops, and made no provision to supply their place with a Canadian regular force. The plan of selecting as Ministers of Militia representatives from the only Province where a British garrison remains, was, I presume, a precaution against any pressure from their constituents being brought to bear upon them to induce them to stretch the law in favor of establishing any *nucleus* of regular troops, though in other respects some of its provisions have been violated and some not put in force. The law provides for filling up corps by ballot in those districts where volunteers fail ; it is not needed among the Anglo-Saxon population of Ontario and the Maritime Provinces, who inherit an ancestral preference for voluntary service and that dislike to conscription which, since the introduction of national armies, has effaced Great Britain (except in Asia and Africa) from the military Powers of the world. Ontario and the Maritime provinces, with their 25,000 stalwart volunteers, have no need of conscription at present : they have as large a force as we can afford to train, even as militia ; and the first note of danger would, doubtless, increase that number to any extent that might be required. But though equal in *physique* and intelligence to any soldiers in the world, I do not believe that twelve days' drill per annum, or eight days in camp, as last year, can give solidarity and discipline. On the other hand, the Latin races neither in the old world nor in the Province of Quebec take kindly to volunteering : it does not suit their idiosyncrasy ; but they are not averse to pay that debt due by every free man to his country, viz., personal service by conscription, as they proved before, when necessary. The advantages of introducing the thin end of the ballot-wedge in the rural districts, where it is mostly required, and would not, I believe, be resisted, are :

1st. That it immediately produces discipline by relieving

the officers from personal obligation to their men for consenting to attend drill.

2nd. It would very soon do away with the necessity for its application by removing opposition to volunteering on the part of employers of labor, whose personal dread of the ballot would induce them to encourage volunteers.

3rd. It would consolidate and give real discipline to existing corps, over whom it would hang suspended.

4th. The essence of an effective military system is that it contains the germ of indefinite expansion without the introduction of any new feature.

It is futile to suppose that a struggle for national existence of 4,000,000 against 40,000,000, even with the aid of Great Britain (in money and ships—soldiers we cannot expect), could for a moment be maintained without recourse to the ballot, for which the law provides, making the exception, as it does, in favor of Quakers, Mennonites, Tunkers, and other non-fighting persuasions, whose dollars would not, therefore, depart from our shores, where they would be guarded by their less scrupulous fellow-citizens. But is it worth while balloting men for twelve days' drill in twelve months, or eight days in camp, two of which are used in going and coming? Sunday, intervening, leaves *five days for musketry and drill instruction* in a language foreign to the men, the majority of whom also are recruits. "*Le jeu ne vaut pas la chandelle.*" The law leaves a loop-hole to any man, who, by giving six months' notice at his first enrolment, can avoid all subsequent trainings, and, therefore, in some corps, results in a fresh set of men for each year. When corps do not train simultaneously, the same men may muster in several corps. But is it advisable that the populous and strategically exposed Province of Quebec should, for all practical purposes, be dropped out of the military system of the Dominion? It is very noble of the people of Ontario to

undertake the defence of the sister-province as well as their own; but is this contemplated by the French-Canadians, generally supposed to be no degenerate descendants of a proud and warlike race? I trow not, judging by their history in the past, and taking the interesting *brochure* of Colonel D'Orsennens as an exponent of their present sentiments.

A hard and fast system of camps, and the same number of drills for all arms, has been laid down, which suits admirably some rural districts in Ontario, but is utterly unsuitable to the busy maritime cities of Quebec. The long, dull winter-season should be utilized; and city volunteers, especially artillery, who require infinitely more instruction than the other arms, should not be given twelve days' pay, which is apt to restrict them to twelve days' drill, but a handsome capitation-grant, according to the number of efficient in the corps. By this system British artillery volunteers can be got to put in as many as 100 or 150 morning or evening drills in the course of the year, producing genuine efficiency as well as regimental feeling, which I should say is impossible to men who meet as soldiers only twelve days in the year. In any case, it would be preferable to reduce the number of volunteers by one-half, and give to the remainder double the amount of training.

With all due respect, I am of opinion that the late order, raising the rate of daily pay, and at the same time reducing the number of days' drill, is a dangerous step, from which it will be difficult to recede; the total amount of pay (sixty cents a day and a full ration) for one training, *twelve* days at headquarters of corps, or *eight* days in camp, received by the Canadian militiaman (already the best paid soldier in the world), being nearly the same as heretofore, viz., fifty cents per day and a full ration for *sixteen* days, while the efficiency purchased for it is less. Raising the rate of pay for the rank-and-file is a grave consideration. Keeping a force enrolled on high pay for

such length of time as necessity might dictate would beggar the treasury of a richer country than Canada; while reducing the pay at the moment men are called upon to suffer hardships and put forth their best energies, would be a severe trial for any but the Angelic host.

If the foregoing pages prove anything, they prove that, against the lightning-strokes of modern war, hasty levies, *en masse*, however brave, are useless. Danger would, doubtless, bring thousands of skilful Canadian rifle-shots, hardy backwoodsmen, and yeoman-farmers, to defend their frontiers, as they have done before; but no amount of enthusiasm will produce scientific officers, in whom they could have that confidence which is the parent of success. The Hon. Mr. Mackenzie, the present Prime Minister, has gained the gratitude of the future Canadian nation by initiating a Military College, which he appears to have evolved from his inner consciousness without enlightenment from military pamphleteers. In the House of Commons, while he was still leader of the Opposition, he recommended a Canadian Military College; and in the Militia Report of 1872 may be found the following remarks (page 34), which the Report for 1873 (page 54) reiterates:—"The most obviously advantageous method of utilizing scientifically trained officers, during peace, is that adopted in the United States, where a large proportion of those educated at West Point can be employed on public works. The gigantic railroad, canal, and boundary surveys undertaken by the Canadian Government give ample scope for the employment of assistant military surveyors and engineers, who would thus form the *nucleus* of a practically scientific Staff Corps, whose intimate knowledge of their own country and the maps they would construct would be of incalculable value in the event of war, and useful in peace. These services are, at present, in some instances, done for us (and, I have no doubt, with great ability) by

"foreigners, whose knowledge of our country might not
"always be to our advantage."

Having been for the last eight years engaged in military instruction, five years as Superintendent of the Gunnery School at Woolwich (part of the time as an independent Examiner on Artillery at the Royal Military Academy, appointed by the Director-General of Military Education), all officers of the Royal Engineers and Royal Artillery consequently passed through my hands on joining, as well as all officers of Cavalry and Infantry from the Staff College, and many officers of Militia and Volunteers. To this experience has been added that of nearly three years in the formation and command of a Gunnery School at Quebec, more trying than any previous duty. It may be seen by the *syllabus* (a copy of which is annexed to the preface of these papers) that an effort has been made, without aid from professors, to teach (with what success it is not for me to say) all the subjects of practical value to Canadian officers that form the course at the Staff College of the British army. I ventured to suppose, therefore, that I might be of some little service in forming the Canadian Military College. With that view I visited West-Point, and offered to send in a report, which I was officially informed, however, was not required, an ample one having been subsequently furnished by Lieut.-Colonel Fletcher, Scots Fusilier Guards, Military Secretary to His Excellency. I, therefore, volunteer no opinions on the subject, beyond the hope that the following may not be lost sight of. Though of no importance now, the day must come, sooner or later, when to the scientific soldiers of Canada must be confided the destinies of a nation territorially greater than the United States. Such comparison of our wilderness may well raise the sneer of incredulity; but if Buckle's *History of Civilization* points any practical moral, it shews that no matter how rapid the growth of powerful States in more favored regions, yet the Nemesis

of a soft climate and vast wealth enervates a people, while it may fairly be hoped that the old Norse race will recuperate in a hard Canadian climate similar to that which cradled our forefathers,—the same fierce, yet chivalrous, barbarians that Tacitus tells of, with blue eyes and gigantic stature, before whom the Roman legionaries trembled as they slid down the snow-slopes of the Alps on their broad shields, in wild and warlike glee, till they surged against the walls of Rome;* and because the old Viking energy, no longer employed in sacking cities, but wresting gold from the fastnesses of nature, keenly trading with his fellows, felling the forests and subduing the prairie, no longer thinks of arms, and votes down its salaried soldiers to the lowest figure,—so all the more responsibility will fall upon the few educated by the State to wield the sword. Woe to that people whose scientific soldiers are not the gentlest, most chivalrous and liberal-minded of men, educated to a broad Dominion patriotism, and free from provincial or sectarian fanaticism.

It would be well to insist on military training and discipline being introduced by law into every Canadian School or College: the mental, moral and physical advantages to be derived from it are self-evident, especially on this continent, where youth, seldom taught to obey, rarely ripens into manhood capable of self-control or fit to command others. No nationality can exist without physical force to support the majesty of law, international or domestic,—for the latter, the constable's baton, which the rowdy occasionally treats with the contempt bred of familiarity, save where the less familiar bayonet is known to be in reserve.

* NOTE.—Our young Canadians shew their Berserker origin in their delight for such sports as sliding down the frozen cone of Montmorency.

The responsibilities of self-government logically include those of self-defence. The withdrawal of the Imperial troops gave rise to the necessity for a small regular Canadian national force as a *nucleus*, a pattern and school for the Militia. The Militia Report for 1872, pages 36 and 37, and that for 1873, pages 52, 53, and 54, as well as the able *brochures* of Lieut.-Col. Fletcher and Lt.-Col. D'Orsonnens (1874), go into the details of this subject; but neither of the officers mentioned provide for the adequate training of the scientific corps, Engineers and Artillery.

To acquire a practical knowledge of the mounted branch of the latter, the most difficult arm of the service, a permanent instructional Field-Battery is necessary for each Provincial Gunnery School, as well as for the Military College; while the General Order (24) of 20th October, 1871, paragraph 21, providing for a Gunnery School at New Brunswick, might well be put in force, as well as the conversion of the permanent battery at Winnipeg, Manitoba, into a Field-Battery of Instruction, available for active service in the event of the police ceasing to perform artillery duty, or being more than *five or six hundred miles distant* from the point where their services might be required.

As Canada swarms with skilled riflemen, who, in emergency, under trained officers, would soon acquire all they want to make them excellent infantry—viz., discipline,—it is manifest that the largest proportion of these permanent *nuclei* should be Artillery (Field and Garrison), with a smaller proportion of Cavalry, as well as a small corps of Engineers and Artificers at each fortress to execute petty repairs, on the “stitch-in-time” principle. We want no military “loafers” around our cities. The Prussian army is a national school, such as we are not likely to have in Canada; but, in these days, a soldier who is not kept burnished by instructing others is apt to rust. The officers

and non-commissioned officers of these corps must be permanent instructors of their own men, of the Militia, and of such lads not necessarily belonging to the Militia, who might advantageously be admitted (especially during the winter season) for short courses of drill, duty, and discipline, during that period between leaving school and entering business, which, with advantage to the State and to the individual, might be devoted to that moral and physical culture which true military training under a genuine soldier is sure to develop.

The rank-and-file of the permanent corps, after serving three (3) years, might be drafted into military colonies in the North-West, still liable for military service on an emergency, or employed as guards for depots of stores, or in the construction of railroads or other public works, at a fixed rate of working-pay, under the direction of the future graduates of the Canadian West-Point; but as the natives of a new country have already so many profitable openings for a living, and are, as a rule, averse to military discipline, the Canadian system of military service and colonization might be affiliated to one of military emigration,—not very palatable, perhaps, at first sight, to the British military authorities. But as returns prove that the short-service men do not go into Mr. Cardwell's proposed reserve, they might as well become Canadian soldiers, and finally military colonists, as dribble off to the United States or join the dangerous classes at home. Short-service men of good character (and no others need be taken) are well worth an assisted passage, having been just sufficiently long in the service to acquire habits of discipline, making them good soldiers and valuable citizens, especially in a frontier-country, without their having reached that stage of old-soldier who makes an indifferent colonist from having run in a groove all his life, and, perhaps, acquired intemperate and idle habits. This rule is, however, by no

means without many exceptions. My experience as to the facility of recruiting for "B" Battery, in which there is no prospect of a permanent career, leads me to suppose there would be no difficulty in maintaining a comparatively large force in the manner I propose. There have also been a considerable number of intelligent French and Alsatian soldiers who prefer becoming Canadians to being Prussified.

But why have any soldiers, or guns, or forts? "The best defence of Canada is no defence"—that oft-repeated paradox of unsexed intellects, so dear to hearts that dwell in the trousers-pocket; "for, where the treasure is, there will the heart be also."

The peace-at-any-price paradox-repeaters may be found criers of "peace! peace! when there is no peace;" and the sordid may regret, in the end, that they did not insure against the sword as well as against fire and shipwreck.

Of those who consider the Washington Treaty, the payment of the *Alabama* award, the yielding of our frontiers, our fisheries, and the Fenian claims, as the advent of the millennium of peace, or a proof that England has abandoned all idea of helping us or enabling us to defend ourselves, I would ask: When did the payment of tribute ever shield the weak and pusillanimous from the strong?

Did the gold of the degenerate Roman keep the Barbarian from her gates until the sword of the soldier was flung into the scale? But we live under the Christian dispensation; and our polished and friendly, though powerful, neighbours are not barbarians.

As to Christianity rendering war impossible, its Divine founder said He "came not to send peace, but a sword;"

and His last advice to His followers was : " Let him that hath no sword sell his garment and buy one." Time has proved the soundness of the advice.

With all due respect for our cousins, but without that abject adoration of success and power to which we are prone, seek in history for a more severe reprisal than that of placing their conquered brothers under the political thralldom of their negro slaves.

True, our neighbours are at present burdened with a debt for, and sick of the memories of, a fratricidal war, into which they rushed with the light-heartedness of amateurs. But, is there no possibility of any future re-distribution of this continent? Will there never be a desire on the part of any neighbouring republican section of the great English-speaking family to join a federated Empire or return to ancient institutions? and if so, what part will a disarmed Canada play?

Of those Candians who desire annexation, I ask : What sort of terms will our smart cousins give to those who have not the "*ultima ratio regis aut populi*?" Though forewarned, and yet unarmed, peaceful annexation might be found troublesome through the stubbornness of a possible minority ; for,

" Ontario men are stern of mood,
Canadian rifles true and good,
Voyageur woodmen staunch, though rude;
O'er forest hills the trails are steep,
St. Lawrence waters broad and deep;
And many a banner will be torn,
And many a man to earth be borne,
And many a pouch of cartridge spent,
Ere Stars and Stripes shall cross our Trent!"

I hope my hearers and readers will excuse the travestie of the Scottish border bard.

Of those who think that commercial relations will render war impossible, producing a sort of mutually inconvenient Siamese-twin nationality, with that bond of proverbially pie-crusty promises on parchment which diplomatists delight in and call "treaties," but which men of the sword have to support or see torn up, I would ask if trade-interests have never been subjects of dispute, especially between the weak and the strong? Was it a question of a tax on tea that set aflame the War of Independence between the two great branches of our race? Was not the tariff the main cause of the severance of the North and the South, though subsequently the shibboleth, slavery, was prominently brought forward, and became a war-cry between brothers in blood who had quarrelled in their trade? Are there still no burning questions in the South for the North to answer? Are there no Granges in the West?—and are all parties in England pleased at what some consider the prospect of partial exclusion of her commerce with Canada, in favor of the United States, as a natural sequence of reciprocity? Though it is natural to suppose that Imperial Parliaments, past and present, being more occupied with the parish politics of a people too absorbed in the Tichborne trial to notice the cotemporaneous Treaty of Washington, have little inclination to interfere in any course Canada might think fit to follow, English diplomatists having *treated* away her cis-Atlantic Empire as soon as it was won by her soldiers and sailors, beginning as early as 1632:

1st. When Quebec was captured by English ships, in 1629, under Sir David Kertz (or Kirke), a French refugee, who carried Champlain a prisoner to England, a treaty with France, in 1632, restored to her Quebec, Acadia (Nova Scotia), and Isle Royal (Cape Breton), Champlain returning to Quebec and resuming the government, and restoring New France for a fresh struggle

between the two great rival powers under Wolfe and Montcalm, who might have spared their blood and that of many brave men had they known that the verdict pronounced upon their death in the *boudoir* of a French king's mistress (*de Pompadour*)—" nous avons perdu quelques arpents de neige en Amérique"—would, in substance, be re-echoed in the British Parliament a century later by *les Philosophes emascules*, who believe that commerce will remain when Empire is abandoned.

2nd. By the treaty of 1763, England acquired all the French possessions in America.

3rd. By that of 1783, she abandoned to the United States, "immense tracts of territory, unsettled, and, in fact, unexplored and unknown."

The boundary was fixed from the north-west angle of the Lake of the Woods, due west to the source of the Mississippi, an impracticable line, for the sources of the Mississippi are many hundred miles to the south.

4th. Consequently, by Jay's Treaty of 1794 and the Convention of 1815, the boundary was changed to 49th of northern parallel, driving Canada into the Arctic regions, to be subsequently sandwiched by the purchase of Alaska from the accommodating Russ.

5th. By the treaty of Ghent, in 1814, "though England was actually in possession" (chiefly through the gallantry of native Canadians) "of the fortress of Mackinaw, of Lake Michigan, of the site of the present city of Chicago, and "of a line of territory terminating at the fort of Prairie du Chien, on the Mississippi,—had won back, in fair fight, and "held, by right of war, the whole of the territory conceded in "1783, and which now constitutes Michigan and the more "northern States of Wisconsin and Minnesota," and of a fort 450 miles down the Mississippi, captured and held by

Colonel McKay, a Scotch-Canadian, and Captain Rollette, a well-known French-Canadian adventurer, with a force of Indians, half-breeds, Orkney-men, and *voyageurs*,—the whole territory was ceded to the United States, as also the State of Maine, ours, “not only by right of war, but with the “consent and content of the population.”

“On the Pacific Ocean we gave up Astoria, on the south “shore of the River Columbia, actually, at the time “of surrender, in possession of British subjects. On the “other hand, the Americans gave up nothing, for they had “nothing to give, and had not even a sentry on the Canadian “shore.” Had it been otherwise, England retaining her conquests for the cost of war, Canada would have had unfrozen seaports on the Atlantic coast, instead of being in the position of a growing lad, obliged to breathe through his nose because a stout neighbour sits on his mouth; and the Canadian Pacific Railway “would have been some 1500 miles shorter.”*

6th. The Ashburton Treaty of 1842 ratified these inconveniences.

7th. In 1846 the United States got Oregon, it is said, mainly because the sporting commander of a British man-of-war reported that the salmon of the Columbian River would not rise to a fly. Common rumor is not invariably a common liar.

8th. And finally, the last Treaty of Washington (1871) has left the spread-eagle gorged. That bird is distended, but not inclined to doze.

He who said, “I care not who writes the history of a people, provided I write its ballads,” would have been

* NOTE.—“Quirks of Diplomacy,” by Lieut.-Col. Coffin, Commissioner of Ordnance and Admiralty Lands, Canada.

pleased with the sententious exposition of policy conveyed in the refrain of the sweet singer of Uncle Sam :

"If I was legislator of these 'ere United States,
I'd settle the fish-question accordin'—
Give the Yankees all the meat,
And the British all the bones,
And put the boundary t'other side of Jordan."

At last, under the reign of King Cashbalance, England withdrew her troops, sold her guns and shot to Yankee contractors, and shipped home—perhaps for tropical service in her black empire—her snow-shoes and sentry-boxes, apparently considering Canada incapable of being helped, and unlikely to help herself, having turned out her own Government on the Militia Bill.

Those who blame England must bear in mind that the last Canadian Parliament endorsed the last Treaty of Washington, and asked the Imperial Government to withdraw their gift of armament and transfer the guaranteed loan of £1,000,000, sterling, from forts, to swell the Pacific scandal, the net result being that we have, as yet, neither forts, guns, nor railroad; and as for British help, who "in Heaven above, or in the earth beneath," helps those who will not help themselves?

I cannot suppose that any unwise words of a soldier, asking the solution of a few simple questions on which rests the apparent possibility of war, could be productive of serious results, except to himself, who, if he thinks it a duty to speak, must endure the unpleasantness of saying things some folks don't want to hear.

The soldier who has seen war and yet desires it, for personal ends, must be a fool or a ruffian—probably both.

The cultivated classes in the United States are a truly noble people, generously disposed towards Canada, and not

desirous of our forcible annexation ; nor would they grudge her the military institutions necessary for the social order of all communities, which are also the best guarantee against hostile acts, into which they might be forced at some future date, as heretofore, by the necessities of violent demagogues, who require a sensational plank for their political platform.

The eminent, yet modest, soldiers who lead the United States army are notably chivalrous gentlemen, tempered in the fiery trial of war to a true nobility of character that would disdain to strike a weaker kinsman. Unfortunately, Republics are not invariably guided by the noblest classes ; nor are all our American cousins quite so enamoured of the success of their own institutions as candidly to advise us voluntarily to accept them, except, perhaps, from the pardonable weakness attributed to the tailless fox.

NOTE.—*The conclusion of this paper was not read before the Literary and Historical Society of Quebec, and is not, therefore, printed in their TRANSACTIONS ; nor are they in any way responsible for its contents.*